Ethnoecology in The Colombian Amazon: Tikuna-Wildlife Interactions in Amacayacu National Park

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Abstract

This study examines human-wildlife interactions in Amacayacu National Park in the Colombian Amazon (3°02'-3°47' S, 69°54'-70°25' W). It explores local concepts of nature to contribute towards culturally relevant conservation that provides long-term solutions to environmental issues. Research was carried out with indigenous people from the Tikuna communities of Mocagua (population=511) and San Martín (population= 480). Male and female participants between 3-78 years took part (n=228). A multi-methods approach was adopted to assess the social, cultural, nutritional and economic significance of wildlife, and findings favour the implementation of holistic biocultural conservation methods. I carried out all-occurrence sampling, participant observation, semi-structured interviews and workshops, as well as acquiring information through one-to-one conversations and group discussions, and by documenting community events and practices using Participatory Film-Making. Dramatisations, games and music sessions were also carried out with children.

Quantitative and qaulitative data, obtained during categorisation tasks, suggest gender plays a significant role in establishing people's knowledge and perceptions about wildlife (comparisons between men and women for food χ^2=6, df=1, n=105, p<0.05 and pets χ^2=32, df=1, n=75, p<0.05). The communities' locations also influence how people use and value wildlife as opportunities through tourism, research and conservation fluctuate. This creates economic and environmental differences which are most prominently reflected in the local diet and people's livelihood options. Dietary assessments reveal that domestic meat, which must be bought or traded for in near by towns or villages, is consumed in Mocagua (χ^2=37.44, n=59, df=1, p<0.05) while people go without meat more frequently in San Martín (χ^2=20.77, n=274, df=1, p<0.05). Conversations with the elderly and the young show that socio-economic factors and dietary taboos vary temporally as well as geographically (comparisons between adults and children in Mocagua χ^2=45.88, n=183, df=5, p<0.05 and San Martín χ^2=11.89, n=183, df=5, p<0.05), while the films people made using the video camera further indicate a difference of opinion about what should be the focus of conservation and development in their communities.

In memory of Mary, Doña Josefina & Mowachü

"Kerneled up within us all, an intimate wildness, sweet as a nut.
To the rebel soul in everyone, then. The right to wear feathers, drink stars
and ask for the moon!"

[**Griffiths, J. **2006** 'Wild. An Elemental Journey', p.**4-5**]

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Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

List of Tables and Figures

List of Tables and Figures

List of Tables and Figures

List of Tables and Figures

List of Tables and Figures

List of Appendices

List of Appendices

List of Appendices

Chapter 1

Introduction and Background

Chapter 1: Introduction and Background

1.1 Introduction

Cultural and anthropogenic factors have shaped natural ecosystems for millennia, and where people and wildlife share habitats they form unique and multifaceted relationships. It has long been acknowledged that indigenous peoples who have a close connection with their lands are instrumental in maintaining regions of biological richness [Motard 2007; Balée 1993]. Indeed, humans are recognised as the most prominent force affecting landscapes and climates in our current era, changing global and local environments at an exponential rate [Palmer *et al.* 2008]. Taking into account the impact and influence of human societies on their environments is key to biodiversity management [Cormier and Urbani 2008]. Although the cultural and social links between humans and animals have been of interest to anthropologists for decades [Kohn 2007; Descola 2006, 2005; Cristancho and Vining 2004; Erikson 2000; De Castro 1992; Conklin 1967; Lévi-Strauss 1967] these associations have been largely overlooked by natural scientists and conservationists until recently. This has led to environmental mismanagement in National Parks, unsuccessful conservation strategies and culturally inappropriate resource management policies. A bounty of literature now exists explaining how local knowledge can be integrated into the development of management plans. For example, the social, economic and political dimensions of hunting, and the use of wildlife to assess and establish conservation strategies [Shepard *et al.* 2010; Kohn 2007; Bhagwat and Rutte 2006; Langton *et al.* 2005; Wadley and Colfer 2004; Ráez-Luna 2001; Berkes *et al.* 2000]. This approach requires an understanding of the traditional beliefs and customs carried out by indigenous people, such as folklore, taboos, rituals and medicines; many of which have unique implications on culture, society, biodiversity and the environment [Shepard *et al.* 2010; Cormier 2003]. A new agenda that focuses on the coproduction of Traditional Ecological Knowledge (TEK) and scientific research for a more holistic approach to conservation is now being advocated [Ungar and Strand 2012].

This thesis provides an account of human-wildlife interactions in two indigenous Tikuna communities that intersect the boundaries of Amacayacu National Park (ANP) (3°02'-3°47' S and 69°54'-70°25' W) in the Colombian Amazon and looks at how local people are adapting to environmental, social and cultural changes. The ANP is recognised as a "Biodiversity Hotspot" [Myers 2003]. Conservation initiatives, resource management and development programmes have taken place since its creation in 1975, providing a unique setting in which to examine the consequences of living in a protected area and how this affects the ways local people perceive nature. The local communities living in ANP have been engaged in various ventures and negotiations with non-indigenous people, over the years. This has included conservation and research projects, tourism, religious movements, employment under commercial extractors and global trade. Such activities have been central in shaping current environmental and cultural conditions. There are seven ethnic groups living in the Amacayacu region (Tikuna, Yagua, Cocama, Macuna, Huitoto, Marubo and Boras) of which the Tikuna are the only tribe who have maintained their ancestral land. The processes of socio-cultural and economic transformation are of particular interest in the Tikuna reservations of Mocagua and San Martín because of their distinct locations. San Martín's relative geographical isolation compared to Mocagua has meant that these two communities provide an ideal paradigm from which to study the factors that cause social, cultural and economic changes to occur. Mocagua is on the Amazon's main tributary and therefore more easily accessible than San Martín. When travelling by motorboat from the port town of Leticia (the Amazon's capital) Mocagua can be reached within 2 hours while an additional 1.5 hour journey down the Amacayacu River in a smaller, less reliable boat must be made to arrive at San Martín. Consequently, the community of Mocagua receives a greater influx of researchers, conservationists, tourists and other visitors than San Martín which brings about differences which are expressed in the way people relate to and perceive their environment.

In this study I adopt an interdisciplinary approach to my research by applying biological and social science methods to explore local perceptions and uses of wildlife among the Tikuna. This 'ethnoecological account' focuses on the ways in which the Tikuna conceptualise wildlife and their natural environment, and it investigates how these beliefs vary culturally and are shaped by a myriad of

interconnecting variables. Ethnoecology has been defined by Davidson-Hunt [2000] as *"[T]he science of how people understand the relationship between humans, animals, plants and physical elements of a local environment".* While ecology is the study of the interactions between living organisms and their environment, enthnoecology applies a human focused approach. There is an emerging consensus that blending the theory and techniques of the biological and social sciences in this way produces knowledge that is more socially useful [Hulme 2007] and supports an enquiry into inter-species relationships [e.g. for ethnoprimatology, Fuentes and Hockings 2010; Parathian and Maldonado 2010; Townsend 1995], both of which provide information that is vital for sustainable conservation planning in National Parks that overlap indigenous lands.

1.2 Aims of thesis

The aims of this thesis are:

i) To examine local perceptions of wildlife among the indigenous Tikuna people whose territories overlap land protected by the Colombian National Parks System. The way people use, classify and value wildlife will be explored to observe how human-animal relationships are constructed at an individual and community level.

ii) To identify the factors that shape the Tikuna worldview in Mocagua and San Martín in ANP, and suggest how these are influenced by different facets of their cultural and historical experiences such as education, tourism and religion. Information will be accessed through conversations with local people and observations in their communities.

iii) To consider how the modification of socio-economic and biocultural landscapes influence people's attitudes towards wildlife and their decisions over resource use. This will be used to anticipate future environmental and cultural changes and the impact that these will have on human-animal interactions among the Tikuna.

1.3 Biodiversity conservation and ethnoecology

1.3.1 Collaborative conservation

An estimated 300 million indigenous people inhabit more than 70 countries worldwide. The term ‘indigenous’ originates from the Latin word 'indigen' meaning "from or of native origin” [Trudgen 2000]. Indeed many indigenous communities carry out practices passed down through generations which intricately link them to their environments, and an international legal framework that recognises the relationship indigenous people have with their traditional lands now exists [Atran 1994]. The World Bank Operational Directive 4.20 [1991] offers the following description: “*Indigenous people are communities a) who have a close attachment to their ancestral territories and the natural resources in these areas, b) whose self-identification and identification by others recognises them as members of a distinct cultural group, c) with an indigenous language, often different from the national language, d) with customary social and political institutions and e) who rely primarily upon subsistence oriented production*”. Supplementary to this, The UN Working Group on Indigenous Populations (WGIP) [formerly the WCIP][1] and the International Labor Organisation (ILO) advocate an unlimited right to self-identification among traditional and indigenous peoples[2] maintaining that the complexity of such societies may only be fully understood by those people who create them, contribute to them and sustain them [Corntassel 2003].

Indeed such are the connections that indigenous people form with their lands, and so well attuned their understanding of their ancestral terrain, that many of those areas inhabited by indigenous peoples remain some of the most biologically and diversely rich regions in the world. As such, land that overlaps indigenous territories is often incorporated into protected zones placed under government protection in the name of biodiversity conservation.

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[1]The World Council of Indigenous Peoples (WCIP) was a formal international body dedicated to securing aboriginal rights accepted on a worldwide scale. The Council dealt with the economic, cultural, political, and social rights of indigenous peoples, along with the retention of their land and natural resources. Before dissolving in 1996 the WCIP secured its members concrete experience in international politics [Gordon 2002].

[2]‘*Traditional peoples’* refers to those groups or communities who live in areas that are peripheral to the rest of society, in a situation of relative isolation from the Western capitalist world, and who have formed their own ways of relating to one another and to other beings or things. Unlike *indigenous peoples* traditional peoples do not necessarily have a cultural identity that sets them apart from the rest of society [Beltrán and Phillips 2000].

In the past, it was common consensus that biodiversity conservation could only succeed in regions of uninhabited wilderness and that indigenous societies should be removed from their lands [West 2006]. This view is somewhat antiquated and a number of countries have changed their policies to support the rights of indigenous peoples to remain in their territories and be involved in conservation rather than excluded from it. Colombia's policies were revised following the introduction of the "Parks with People" statute which recognised the benefits of environmental planning based upon co-produced knowledge [Wells *et al.* 1993]. This involved local communities in protected area management by supporting indigenous cultural practices, premised upon the value of retaining and enhancing communally shared resources [Borrini-Feyerabend and Pimbert 2004] [detailed in **section 1.4.4**]. It has since become a legal requirement during resource management initiatives, under both international and Colombian Law, to consult with indigenous people where their native territories overlap protected regions [Ungar and Strand 2012]. Despite these improvements there is evidence that global land policies aimed to renounce indigenous communal holding in favour of individual ownership continue to cause complications and restrict the success of collaborative initiatives [Hughes and Warin 2005]. Furthermore, the failure to implicate a long-term environmental care strategy in Colombia indicates inadequate efforts to access information about indigenous perceptions of nature from policy makers and conservationists alike.

1.3.2 Human-wildlife interactions

A variety of theories on the structure and classification of nature by indigenous peoples have been published by anthropologists and cognitive scientists in their attempts to categorise an overwhelming diversity of human-nature constructs [Descola 2009a; Ellen 1993; Reichel-Dolmatoff 1987; Kluckhohn 1953]. One of the earliest publications, by Kluckhohn in 1953, claimed that humans either saw themselves as having dominance over nature, being separate from it, or existing as part of one living system. In the early nineties Ellen [1993] claimed that people from more developed Western countries commonly defined nature as any natural aspect of the world that existed outside of the human realm. He wrote, "*This is expressed in the way they 'own', 'care for' and dominate other species*". A number of other studies carried out around the same time as Ellen's work was published commonly shared this notion. By contrast to the dualism of Western thought native

Amerindian peoples were seen to make little or no distinctions between nature, humans and other animals [Biersscak 1999; Ellen 1993; Moran 1990]. Atran [1994] explored these ideas among the Itza' Maya of Guatemala. He found they displayed systematic awareness about ecological complexity that assumed animals, plants and people as equals. For the Colombian Letuama Ji *et al.* [2000] similarly describe an advanced use of dialectical reasoning which permitted ambiguity as a possible state of existence. Indeed, Harding [2006] suggests that the core foundation of many hunter-gatherer societies in South America and their interactions with nature is a common belief that all animals, plants and natural formations are equal sentient beings. These cross-cultural classificatory differences are a useful way of understanding the sometimes contradictory environmental perceptions that surface during collaborative conservation management involving indigenous people, scientists, policy-makers and other stakeholders.

Since the concept of the "Noble Savage", whereby indigenous peoples were once assumed to be 'living in perfect harmony' with nature [Reichel-Dolmatoff 1976], anthropology has made considerable progress in understanding indigenous communities and how they manage nature to survive. A wide literature on traditional ecological practices and knowledge provides compelling evidence that animals hold various cultural, nutritional, financial and biological values to humans, depending on the psychological, economic and social factors that people are exposed to [Hooghiemstra and Van der Hammen 2004; Hilderbrand 1987; Reichel-Dolmatoff 1987, 1975; Von Hugh-Jones 1979]. Subsequently, a range of complex patterns and behaviours develop which are guided by moral beliefs which evolve and adapt according to temporal and spatial variables [Kohlberg 1981].

Some animal and plant species are attributed spiritual or symbolic values [Reichel-Dalmatoff 1987; Palma 1984; Reichel-Dalmatoff 1975], while others have been coined "Culturally Keystone Species" (CKS) [Cristancho and Vining 2004]. A CKS is defined by Cristancho and Vining [2004] as "*Any species upon which the existence of an entire culture, or a significant cultural practice, may reside*"[3]. Despite some advances in early anthropology Dwyer [2005] suggests that many

[3]CKS are likened to "Ecological Keystone Species" which play a critical role in maintaining the structure of an ecological community [Paine 1995].

ethnographical studies were still deeply prejudiced by the researcher's own moral beliefs and conceptualisations of nature. He writes; "*What was presented as 'their' taxonomy was, ultimately, the closest match that could be found to 'our' taxonomy. This was achieved by selective use of data and by devising overarching, meta-classifications that prioritized 'Western' or 'scientific' understandings*" [cited in Dwyer 2005: 11]. Later, came the realisation that anthropologists must seek out the differences between cultures rather than constantly searching for patterns and uniformity. A handful of academics adopted an ethnoecological viewpoint in their work and began to acknowledge alternative worldviews as realities for indigenous peoples [Descola 2006; De Castro 2004a; Roepstorff 2003; Ingold 2000].

1.3.3 Worldviews and ontologies

Tim Ingold [2000, 1996, 1986], Philippe Descola [2009a, 2009b, 2006, 2005, 1996] and Viviero De Castro [2004a, 2004b, 1996, 1992] all provide a profound understanding of human-nature relationships. They each attribute a spiritual form of communication between indigenous peoples and other species which account for multifaceted and social relationships between humans and animals. Ingold explains how local belief systems, traditional knowledge, sacred sites, taboo and folklore, collectively determine human concepts of nature [Ingold 1986]. These principles are established through social rules and environmental conditions, which mean people develop specific non-static ontological perspectives of the world [Developmental and Experience Based Ecological Decision-Making Framework, Ingold 1986]. As I understand, Descola [1996] suggests our ontologies influence our decision-making, and how we relate to other species.

Descola explains the ways in which people experience the world as four discrete groups or 'ontologies' that arise from specific amalgamations of internal and external processes: i) 'Totemism' recognises shared characteristics between the internal and externalities of all sentient beings: ii) 'Animism' views all living and non-living beings as taking on different physical forms whilst sharing an internal essence that enables cross-species communication; iii) 'Dualism' acknowledges similarities in external forms between different species and a common evolutionary line but defines clear distinctions between human and animal consciousness and iv) 'Analogism' conceptualises a discontinuity among living things which are borne from distinct evolutionary origins. In his later work Descola discusses how these

ontologies or “habits of the mind” as he refers to them, are continually influencing the ways we adapt to new contexts and new environments [Descola 2009a]. While Ingold’s early work suggests that decision-making is implicated in the environment [1996, 1966] Descola makes clear that certain constructs of the world remain either permanently fixed or at the very least are near impossible to change [2009a, 2006].

Habitual responses and distinct worldviews create disparities between individuals and the ways they experience their environmental surroundings [Latour 2009]. This can cause complications when attempting to develop collaborative resource management plans. For example in his 2006 publication Lenaerts reports that during conversations with policymakers the Ashéninka people of Saweto, Peru, used terms that were unfamiliar to their European counterparts. He explains; “*Indigenous conceptions about bodies, souls, material substance and inter-personal relationships are interconnected in a distinct, non-Western way such that it is impossible for any depth of comprehension to be acquired among non-indigenous peoples”* [*ibid*.]. Indeed De Castro’s [2004b] essay on ‘perspectival multinaturalism’ demonstrates the diversity of human-nature perception and reality through the very specific ontology of the Amerindian animist hunter who engages socially, physically, spiritually and emotionally with his prey. In doing so the hunter part transforms into the species he is hunting [**section 4.5.3**]. Lenaerts writes; “*The inability to conceive an other's reality creates a juxtaposition of core beliefs that is the root cause of misunderstandings and places boundaries on cross-cultural collaboration*” and this is clearly something that should be addressed.

1.3.4 Animism and holistic reasoning

There is universal evidence that animist societies understand all species to have an underlying causal nature, or ‘internal essence’ which is uniquely responsible for their appearance and behaviour [Atran *et al.* 2002; Atran *et al.* 1999; Descola 1996; Gelman and Wellman 1991]. This establishes a continuity between humans and non-humans which allows animists to endorse societal relations with animals, and inculcate ways of communicating with ‘other-than-human’ persons. Animism can take the form of *predation, protection* or *reciprocity*. Evidence of predatory animism exists among the Jivaro of Ecuador [Descola 1996]. It is described by Fausto [2008] as a type of ‘symbolic cannibalism’, while ‘protectionism’ is the label

given to human domination over nature and other animals. Examples of this are common in most human societies and include practices such as pet-keeping and the domestication of animals [Descola 2005]. Quite different to predatory animism and protectionism, 'reciprocal animism' sees humans and other species as interchangeable constructs of energy that give and receive through an *equal* exchange [Arhem 1996]. This rationale is guided by holistic reasoning [Lechuga *et al.* 2011] and includes multiple interactions between humans, spirits, animals, plants, the earth and the cosmos.

Ceremonies and practices such as hunting rituals and folkstory telling endorse animism through the sharing of moral principles, either literally or symbolically. This philosophy forms the basis of a number of practices that were once adhered to by all Tikuna people, but which are now followed by few. Tikuna hunters would traditionally, visit the shaman before a hunting trip to request permission to take prey from the forest. They would offer tobacco as a counter-gift to the forest which the shaman smoked to allow him to communicate with the *dueño* or 'spiritual owner' of the prey in question. The shaman was capable of taking on the perspective of any animal in the forest in order to speak with animals while they were in their 'human' bodies. This meant he could shift his form whilst remaining fixed in his internal essence by undertaking a temporary bodily transformation to match their 'animal' form. In the past, the advice given to the hunter following this ritual was nearly always strictly adhered to as people were extremely cautious of the consequences should they ignore the wishes of the *dueño* [Male, Mocagua, May 2007]. As well as being a control mechanism that ensured animals were not over hunted shamanic engagements with wildlife engendered mutual respect for the forest and its prey.

1.3.5 Moral beliefs and practices

Human-nature relationships are guided at a psychological level by people's constructs of their environment but the most influential factor at an individual level is our moral beliefs [Cristancho and Vining 2004]. Morality develops as an adaptive response to the characteristics and demands of culture and habitat which materialise from religious and philosophical teachings learnt from an early age [*ibid.*]. These ideals are culturally encoded in moral norms transmitted from one generation to the next through socialisation [*ibid.*]. Money, antagonism, intelligence

and tradition shape our moral beliefs, however reciprocity is said to be the most prestigious influence globally [Cristancho 2001]. Among the many human societies whose cultures are based upon the equal exchange and investment of deeds and favours, the act of reciprocity is only useful (and sustainable) where all people within that society observe the same set of rules. Intricate rituals and practices, such as those that often accompany resource use in animist societies [**section 1.3.4**], therefore must be established in order to generate these common well-established principles.

When traditional practices are forgotten or overlooked, by even a few, the balance and structure previously maintained within a society shifts. In the context of human-nature affiliations and resource use this has a negative impact upon the environment. A growing lack of interest in shamanism and animism is evident among the Tikuna as more concern is placed upon young people's education, and less esteem is associated with learning traditional knowledge, rituals and practices [Gruezmacher 2008]. Formerly, each Tikuna village in the Amacayacu region had a shaman who was reputed to possess magical powers derived from his or her relationship with forest spirits. The shaman cured the ill by means of sucking and blowing tobacco. They caused harm by emitting invisible thorns to those who had displeased them or demonstrated a lack of respect towards the forest. People from Mocagua and San Martín explained that with the death of the last shaman in Amacayacu in 2005 it is no longer possible to continue the tradition. Neither community has been able to find a suitable or willing young person to take on the role as they are all busy attending school and uninterested in learning shamanism [Male, San Martín, June 2007]. The elderly shaman would typically train his apprentice from childhood (usually a child from the same family). It would take the young novice many year to learn and acquire the skills and wisdom of the shaman before he was ready to assume the role following on from his predecessor. People's priorities in Mocagua and San Martín have changed such that it is now deemed more beneficial for children go to school and find work, instead of spending time in the forest. These transformations have had a significant effect on human-wildlife interactions and their long-term after effects remain unknown.

1.4 Colombia and protected areas

1.4.1 Conservation in indigenous territories

In recent decades the involvement of local people in the protection of biodiversity has been identified as one of the most important developments in conservation [Stearman 1994]. The integral role of indigenous people in shaping and managing landscapes is evidenced through strong associations between areas of biological mega-diversity and the global distribution of native communities [Motard 2007]. Indigenous societies subsist predominantly through a combination of hunting, gathering, collecting, fishing and foraging which require an in-depth knowledge of the local environment [Winterhalder 2001]. Traditional land management techniques, food preparation and preservation (such as smoking and salting), dietary taboos, the sharing of resources and reciprocity all support a subsistence lifestyle and are regarded as valuable conservation practices, so much so that The United Nations Environmental Programme (UNEP) have focused on applying TEK at a global level. A number of countries have made genuine attempts to effectively involve indigenous people in resource management.

In 2000 the Malmö Declaration granted UNEP a mandate which supported the incorporation of indigenous Traditional Ecological Knowledge (TEK) into biodiversity conservation, acknowledging the social, cultural and economic implications of environmental change [Decision 1 (I) 1973]. Since then UNEP have worked alongside the Least Developed Countries Expert Group (LEG) of the United Nations FCCC (UNFCCC) to develop a database on local coping strategies. These data are accessible for use or development as part of National Adaptation Programmes of Action (NAPAs)[4]. Some examples of indigenous peoples' traditional resource practices that have been integrated into the database include: i) The harvesting of a wide variety of seasonal wild vegetables, fruits, tubers and other edibles from the forest during food-scarce seasons, to overcome reduced crop yield due to irregular rainfall, by the Monpas of Bhutan; ii) The ancient irrigation and drainage systems of Peru, which maintain a microclimate that acts as a buffer against frost, droughts and saturation; iii) Alternative agricultural methods, such as floating crop beds and hydroponics, developed to

[4]NAPAs are mechanisms designed to serve as simplified, rapid and direct channels to communicate the urgent and immediate adaptation needs of local communities. They emerged from multilateral discussions on adaptation measures within the UN Framework Convention on Climate Change.

overcome water logging caused by rising sea levels in Bangladesh; iv) Sustainable forest management by the Mebengokre people in the Brazilian Amazon and v) Sustainable living techniques in extreme environments by the San of the Kalahari in South Africa [Motard 2007].

1.4.2 Territories and traditional knowledge

The United Nations Declaration on the Rights of Indigenous People (UNDRIP) was established in September 2007 to end the discrimination and exploitation of indigenous lands and peoples [Motard 2007]. It reads, "*Indigenous peoples have the right to maintain and strengthen their distinctive spiritual relationship with their traditionally owned or otherwise occupied and used lands, territories, waters and coastal seas*". It declares to protect the collective entitlements of native peoples to preserve their cultures, identities, languages, health and traditional education [Article 25]. On paper UNDRIP aims to *"pursue development in-keeping with their [indigenous peoples'] own needs and aspirations*" [Article 31], through the promotion of "*full and effective participation [of indigenous peoples] in all matters"* [Article 10], ensuring *"Their [indigenous peoples'] rights to remain distinct and to pursue their own visions of economic and social development*" [Article 24]. The process of creating the declaration has been criticised however for the time it took to be finalised and implemented; nearly 25 years in the making. This delay is believed to have reflected hesitations among some heads of state to support indigenous peoples' right to self-determination and being granted control over the use of natural resources in their traditional lands [UNFPII 2009]. Stephen Corry, The director of international indigenous rights organisation Survival International said; "*The declaration has been debated for nearly a quarter of a century. Years which have seen many tribal peoples, such as the Akuntsu and Kanoê in Brazil, decimated and others, such as the Innu in Canada, brought to the edge. Governments that oppose it are shamefully fighting against the human rights of their most vulnerable peoples. Claims they make to support human rights in other areas will be seen as hypocritical*" [http://survivalinternational.org/news/2499].

The first global constitution that fought for indigenous peoples to hold on to their ancestral lands was set up in the 1950s when the Indigenous Peoples' Campaign (IPC) was inaugurated. It lobbied for international institutions to uphold indigenous peoples' rights and take account of their priorities in development policy and

practice [Motard 2007]. In 1972 the Assembly of First Nations, previously known as “The National Indian Brotherhood” made it their goal to strengthen the prowess of native peoples by establishing an alliance between global indigenous groups who shared common values [McFarlane 1993]. Following this, from 1974 to 1996, the World Council of Indigenous Peoples (WCIP) was a powerful force and defended Indigenous Rights on a global scale. It represented over 60,000,000 individuals from traditional societies, a number of whom held seats in international politics. Despite a history of campaigning and collaborative policies the rights of indigenous communities to maintain access to their territories and uphold their traditional customs are still repressed. This topic remains a point of contention for biodiversity conservation in areas that overlap indigenous lands.

1.4.3 Conserving biodiversity in the Amazon

The Amazon’s immense biodiversity identifies it as an area of scientific and cultural interest while the Amazon River is an integral water source on a global scale providing 20% of the planet’s requirements. Composed of a myriad of ecosystems and vegetation types the Amazon Basin is an important habitat for flora and fauna as well as supplying valuable resources to people. Seasonal, deciduous and flooded forests, savannas and highlands contribute to the rainforest’s abundant productivity [USAID 2005]. This attracts commercial resource extraction by big businesses and corporations in the name of short-term profitable gain [Bodmer and Robinson 2004]. Estimates indicate that by 2005 approximately 20% of the Amazon Basin had been cut as a result of large-scale commercial deforestation. Agriculture, ranching, logging, mining and petroleum exploration were just some of the contributors [USAID 2005]. More optimistic reports give account of a 23% decline in deforestation since 1998 [www.inpe.br/acessoa informacao<http://www.inpe.br/acessoainformacao] however even at a lower level, large-scale deforestation is detrimental to local human and animal populations alike. The impact of the Amazon’s destruction is intensified by a myriad of factors which operates throughout local, regional and international levels, such as population growth, infrastructure development, expanding commodity markets, insecure land and natural resource tenure and misleading policy incentives [USAID 2005].

Years of management and domestication by indigenous hunter-gatherers have contributed towards the Amazon's rich environment [Marlowe 2010]. Of the 186 National Parks in Latin America more than 80% are home to indigenous communities [Amend and Amend 1992; Brandon *et al.* 1998]. A total of 162 indigenous territories, consolidated through individual land titling[5], cover 374,681 km² of land situated within 12 protected areas in Colombia [COAMA 2010]. This equates to approximately half of the Colombian Amazon, which comprises 5% of the Amazon Basin, allocated to indigenous reserves. These areas spread across regions in the Putumayo, Meta, Caquetá, Cauca, Huila, Nariño, Vaupés and Amazonas departments. Despite these figures Colombia's conservation policy has often conflicted with the interests of indigenous peoples and forced them out of certain regions [Marlowe 2010].

1.4.4 Colombia's natural resource management

The creation of protected areas in Colombia involves a number of highly sensitive and controversial issues making the process a complex and lengthy procedure [Schwartzman *et al.* 2000]. The country's environmental law and indigenous rights movement has had an equally complex history. In 1982 The Organización Nacional Indígena de Colombia (ONIC) was founded to represent indigenous groups in Colombia, and in 1991 the country ratified The Indigenous and Tribal Peoples Convention 1989 (ILO-convention 169) [www.ilo. org/ilolex/english/ convdisp1.htm]. The goal of the ILO was to ensure that, "*The aspirations of indigenous peoples to exercise control over their own institutions, ways of life and economic development, are maintained along with the development of their identities, languages and religions".* However the ILO made it clear that the only aspirations that would be supported were those which fitted into the framework of the states within which they lived [http://www.ilo.org/ilolex/englishconvdisp1.htm]. Together with the United Nations Declaration of Indigenous Rights in 2007 the ILO-convention 169, however, represented one of the most important international instruments for the subsequent enforcement of indigenous rights and collective territorial rights in Colombia [Ulloa 2005].

[5]Land titling is a type of land reform in which indigenous communities, private individuals and families are given formal property rights for land which they have previously occupied informally or used on the basis of customary land tenure [Atuahene 2006].

Colombia's first environmental public policies were established in the 1970s [Rodríguez 2009] one of which was The 1974 Code of Natural Renewable Resources and Environment Protection. The 1974 Code set out a legal framework to guide the principles of natural resource management (i.e. soil, water, woodlands, and fauna) in concurrence with the definition and precepts established for national parks in the IUCN 10th General Assembly in New Delhi in 1969 [IUCN 1970]. Articles 327-336 outlined the Colombian National Parks System which followed a strict rationale for wilderness preservation (Decree-Law 2811, 1974). Article 332 declared that conservation, ecosystem recovery, research, education and recreation are the sole activities permitted in protected areas. Reaffirming these pronouncements three years on, Decree 622 of 1977 stated that, "*Indigenous peoples permanence and right to use natural resources will be respected, as long as they are compatible with the objectives of the protected area*" [Article 7 (622) 1977]. Consequently, indigenous jurisdiction was limited by politically powerful stakeholders which contributed towards many of the subsequent issues faced by the country's indigenous peoples.

Between 1986 and 1991 environmental affairs in Colombia were controlled by the government's National Institute of Renewable Natural Resources and the Environment (Instituto Nacional de los Recursos Naturales Renovables y del Ambiente or INDERENA). This was overseen by the Ministry of Agriculture. INDERENA monitored and instructed the use of natural resources and all regional developments. At this time indigenous people were still being displaced from protected areas in the name of conservation. In 1993, the Colombian National Indigenous Organisation (ONIC) called for a change in the way protected areas were established, to see the territorial rights of Indigenous Peoples respected and strengthened [Rummenhoeller 1995]. This led to a national political debate over "*resguardos"*[6] versus protected areas and hindered the improvement of relations between indigenous peoples and national society. Accordingly, the national environmental policy was developed by the Ministry of Environment, called Proyecto Colectivo Ambiental (PCA). It saw that land and resource use planning were at the core of sustainable development with a substantial social dimension

[6]*Resguardos* grant indigenous communities collective property rights over their lands. *Resguardo* owners are granted with collective bundles of rights that include not only full use and control rights but also the right of dominion, meaning absolute ownership with both title and possession rights. However, the state still holds sub-surface rights [Roldán 2001].

that would also contribute to peace-building [MMA 2002]. The PCA called for planning and management of the environment to be done collaboratively built upon shared responsibilities between the state and other institutional and social actors. The PCA also acknowledged the biological and cultural diversity of the nation, as well as indigenous rights in the Constitution, and proposed for the management of protected areas using an approach called "Parks with People" [MMA 2002]. According to The Parks with People statute, conservation was defined as "*Management that includes preservation, the sustainable use of natural resources and environmental services*" [UAESPNN 200: 48]. It's objectives were to:

i) Assure the continuity of evolutionary processes and genetic flux necessary to preserve terrestrial and aquatic species.
ii) Guarantee the supply of environmental goods and services essential to human development.
iii) Guarantee the permanence of the natural environment, as a foundation of the integrity and survival of the country's traditional cultures.

The policy recognised the benefits of environmental planning based upon co-produced knowledge that linked protected area management to local communities [Wells *et al.* 1993]. It supported cultural practices premised upon retaining and enhancing communally shared resources [Borrini-Feyerabend and Pimbert 2004].

The political reform which saw a shift from "Parks for Nature Preservation" to "Parks with People" meant indigenous people were finally permitted to remain living in their native habitats. Colombia's environmental policy underwent significant changes through the process and seventy new Articles were created concerned with environmental and social matters. These included Article 80: *"The management and use of natural resources should guarantee their conservation, restoration, substitution or sustainable development*" and Article 79: *"It is an obligation of the state to protect the diversity and integrity of the environment, conserve areas of special ecological importance and promote education to achieve these goals*" [Political Constitution of Colombia 1991 cited in Cárdenas *et al.* 2006]. In line with these objectives The Ministry of Environment and The National Environmental System were formed to take on the collaborative responsibility of managing and conserving the environment and its natural resources [Colombia's General Environmental Law 99, 1993]. Indigenous

communities were finally granted land tenure over their territories through the creation of *resguardos*, which brought together recognition of indigenous land and resource rights with conservation. Subsequently it was made a legal requirement that indigenous people be included in decision-making over the management of natural resources within protected areas overlapping their territories.

Following the creation of Colombia's General Environmental Law there are now 56 protected areas in the country including Reserves, Parks and National Monuments [IUCN 2013] and nearly 80% of the Colombian Amazon is protected. Just over 17% (68,324 km^2) of these are Forest Reserves and 21% (83,076 km^2) are National Parks. The management and administration of natural resources in Colombia is jointly coordinated by the state, civil society, and public and private organisations under the supervision of the National System of Natural Parks (Unidad Administrativa Especial del Sistema de Parques Nacionales Naturales or UAESPNN). With so many stakeholders involved, the creation of Parks and protected areas involves an extensive process of negotiation, planning, design and implementation [COAMA 2010].

In 2008 the Colombian government asked that indigenous communities whose territories overlap protected areas produce 'Life Plans', providing information about their use of land and resources; their current and future plans, goals and challenges; livelihood expectations and collective views on education, health, resource use and management. The government claimed that the process was to ensure the fair distribution of national budgets. It was reported that local people in San Martín and Mocagua however, found the experience complex and out of context with their daily activities. Many local people were unable to complete the requested 'Life Plan' [Gruezmacher 2008] and the strategy was highly criticised for not following culturally appropriate principles and failing to consider the needs of individuals; "*The structures provided made it impossible for local people to include many relevant details about their cultural beliefs and practices. In addition, those who were illiterate could not participate and many were restricted with the amount of time they could commit to completing the lengthy document"* [Gruezmacher 2008]. Indeed Morris and McGann [2012] suggest that such loopholes are to blame for restricted indigenous environmental sovereignty and the continued exploitation of forest habitats for commerce and profit.

1.4.5 Conservation in Amacayacu National Park (ANP)

In Amacayacu National Park (ANP) strategies aimed to support collaborative protected area management have been implemented since the 1990s and an inclusive management model was adopted by the Unidade Parques Nacionales of Colombia (UNPC). A dialogue between scientific researchers, indigenous people and Parks staff led to the decision to use co-produced biological and cultural knowledge for decision-making about research and governed approaches to the management of ANP [Ungar and Strand 2012]. On paper, the model included collectively produced knowledge from indigenous people, park staff and academic researchers. Conservation objectives were identified by local people and workers from ANP. A Local Working Group on Research (LWGR), which was established in 2001 and ran for five years, was the platform for dialogue between the stakeholders. Its members included a representative from each of the six indigenous communities in ANP, researchers and staff members. Despite the seemingly collaborative nature of the process Ungar and Strand's [2012] critical analysis of the process suggests it failed to secure the goals it had set out to achieve due to miscommunication over conflicting interests. Ungar and Strand report, *"Only the opinions of the most financially and politically powerful decision-makers were legitimised and local knowledge was made irrelevant*" [*ibid.*].

Parks staff and local people were asked to review all the research projects that had taken place in ANP. This procedure brought to light a number of local concerns. Participants said the majority of investigations in ANP were out of synch with local priorities and had little impact on environmental or social issues. The scientific publications on ANP were described by staff as "*geographically, temporally and thematically biased dependent on the accessibility of places and the interests and financing of the researchers*" [cited in Ungar and Strand 2012]. The report revealed that co-produced knowledge had been ignored during management planning [Ungar and Strand 2012]. The LWGR was criticised for being, "*[A] rather bureaucratic space in which academic researchers' permission for entering Indigenous territories was discussed and where negotiations about financial issues took place, such as on the number of Indigenous people to be hired in research projects and their salaries. There were virtually no discussions on the objectives or the conceptual or methodological characteristics of research projects*" [Director of NGO, Tropenbos International (TBI) cited in Ungar and

Strand 2012: 3267]. Local people were left feeling similarly dissatisfied; "*All our lives we will be watching how others come and do research on us, and when our children grow up there will be nothing left to investigate"* [Local resident from Mocagua cited in Ungar and Strand 2012].

Following their critique Ungar and Strand [2012] provide a number of reasons to explain why collaborative resource management has not yet been achieved in ANP. They suggest the definitions and concepts used when identifying environmental priorities do not support holistic reasoning, which means local people are restricted in the amount they can contribute to decisions over policymaking. During discussions between local people, staff and researchers the objectives for ANP were selected according to a set of distinct categories in-keeping with Western notions of resource management such as the attributes of biodiversity and ecosystem services (i.e. the monetary value of natural resources). Local indigenous constructs of the environment, however, paid attention to the functioning of systems as networks, constituted by temporally and spatially dynamic and social-natural components of territory [*ibid.*]. Researchers and conservationists prioritised the conservation of endangered or 'charismatic' species, while local people gave precedence to the practical and cultural significance of plants, animals, prey, space and medicinal groups [Ungar and Strand 2012]. Initially, it was expected that Conservation Objectives (COs) based on the revision of academic material would be used for making a diagnosis of the conservation state of the Park and the pressures that threaten it. Parks staff felt however, that the academic literature did not accurately reflect the reality. Instead, they proposed that a new set of guidelines based upon 'Integral Criteria Priorities' (ICPs), which focused on local use and shared values, be developed. ICPs represented environmental issues that were valued by the local communities. The local communities and Parks staff presented an alternative strategy for formulating management plans in ANP based upon the ICPs. To date, these suggestions have yet to be integrated.

1.5 Study site and surrounding area: ANP and Leticia

1.5.1 Demographics and infrastructure

ANP is located in the southern extreme of the Colombian Amazon (3°02'-3°47' S and 69°54'-70°25' W) [**Fig. 1.1**]. It comprises part of the municipality of Leticia and overlaps by 10% with the reservations of Cotuhé-Putumayo in the Buenos Aires indigenous community to the North, and the Tikuna-Yagua-Cocama reservation in Puerto Nariño. Indigenous territory belonging to the Tikuna communities of Mocagua, San Martín de Amacayacu, Palmeras, Macedonia, El Vergel and Zaragoza sit within or close to the boundaries of ANP, as well as some Yagua and Cocama indigenous ethnic groups. The port-town of Leticia (4.09° S and 69.57° W), the Amazon's capital, is the closest urban settlement. It has an elevation of 96 metres above sea level and an average temperature of 27°C (80.6°F). According to estimates Leticia has a current population of just under 37,000 people [http://en.wikivoyage.org/wiki/Leticia_Amazonas] the majority of whom have relocated from far-lying rural communities and Colombia's major cities such as Bogotá, Medellín, Tolima and Cali. A significant portion of the town's population also includes indigenous villagers who have migrated to Leticia to find work or start their own businesses. As part of a national regime to improve Colombia's global image in 2003 President Uribe proposed to enhance Leticia's economy through an initiative led by the Decameron resort chain. Consequently improvements were made to a number of local hotels and a tourist lodge was built within the ANP. The number of airlines flying from Bogotá to Leticia increased from one, to three per day. These developments made Leticia more accessible to a range of visitors including tourists, researchers, professionals and students. An influx of international students now regularly travel to Leticia to read environmental studies at The Amazon's National University (Universidad Nacional Sede).

Between 1998 and 2008 approximately 10% of the research carried out in Colombia's National Parks took place in ANP. This included work by national and international students and science professionals [Gruezmacher 2008]. Many of the Environmental Studies students from the Universidad Nacional Sede also conduct short fieldwork projects in ANP. The majority of students work with local residents from Mocagua during this time, as it is the closest village to the ANP research centre and few have the time to visit San Martín during their stay. Most choose to

explore topical issues such as the effects of climate change, or local livelihoods and sustainability [*ibid.*]. Local people in Mocagua are accustomed to researchers staying in their village and are happy to collaborate with them. It is common practice for students to pay residents to work with them as guides or assistants and local people somewhat rely on the small amounts of regular income they receive from this work. On account of local economic growth and the area's relative political stability Leticia is now reputedly the second most popular tourist destination in Colombia, and ANP is one of the most visited Colombian National Parks [http://en.wiki voyage.org/wikiLeticia_Amazonas].

1.5.2 Ecology, landscape and climate

ANP is 2,935 km² and belongs to a rare segment of the Amazon called the 'Amazonian Trapezium'. Highly productive eutrophic lowland white water *várzea* forests receive a seasonal influx of nutrients that feed a prolific plant-life [Gentry 1982]. The National Park falls within the top twenty for size when compared to Colombia's other protected areas and contains a complex group of flora found exclusively in hydrophytic rainforest of warm climates and non-flooded *terra firma* habitat [Haugaasen and Peres 2005a; 2005b; Peres 1997]. This rich habitat contains more than 5,000 plant species, over 500 bird species, 150 recorded types of aquatic and land mammal, fish species from families belonging to six different orders and the most reptile species in the whole of Colombia [Uetz *et al.* 2005]. The terrestrial mammal species found in ANP include 12 of Colombia's 29 primate species and five types of squirrel [PNNA 2006; Defler 2004; Alberico *et al.* 2000]. Such biodiversity is notable in comparison to other protected areas in the Amazon, for example the Jaú National Park in Brazil, recognised as one of the largest forest reserves in South America (23,000 km²), shelters just 120 mammal species and 470 birds, many of which are also found in ANP [Barnett *et al*. 2002]. By comparison Yasuní National Park (9,820 km^2) in Amazonian Ecuador covers an area more than twice the size of ANP and accommodates approximately 320 terrestrial mammal species and 567 bird species [Nabe-Nielsen 2001]. Similarly the World Heritage Site of Manú in Peru (18,811 km²) boasts numbers of mammal and bird species akin to those found in ANP [Ohl-Schacherer *et al.* 2007].

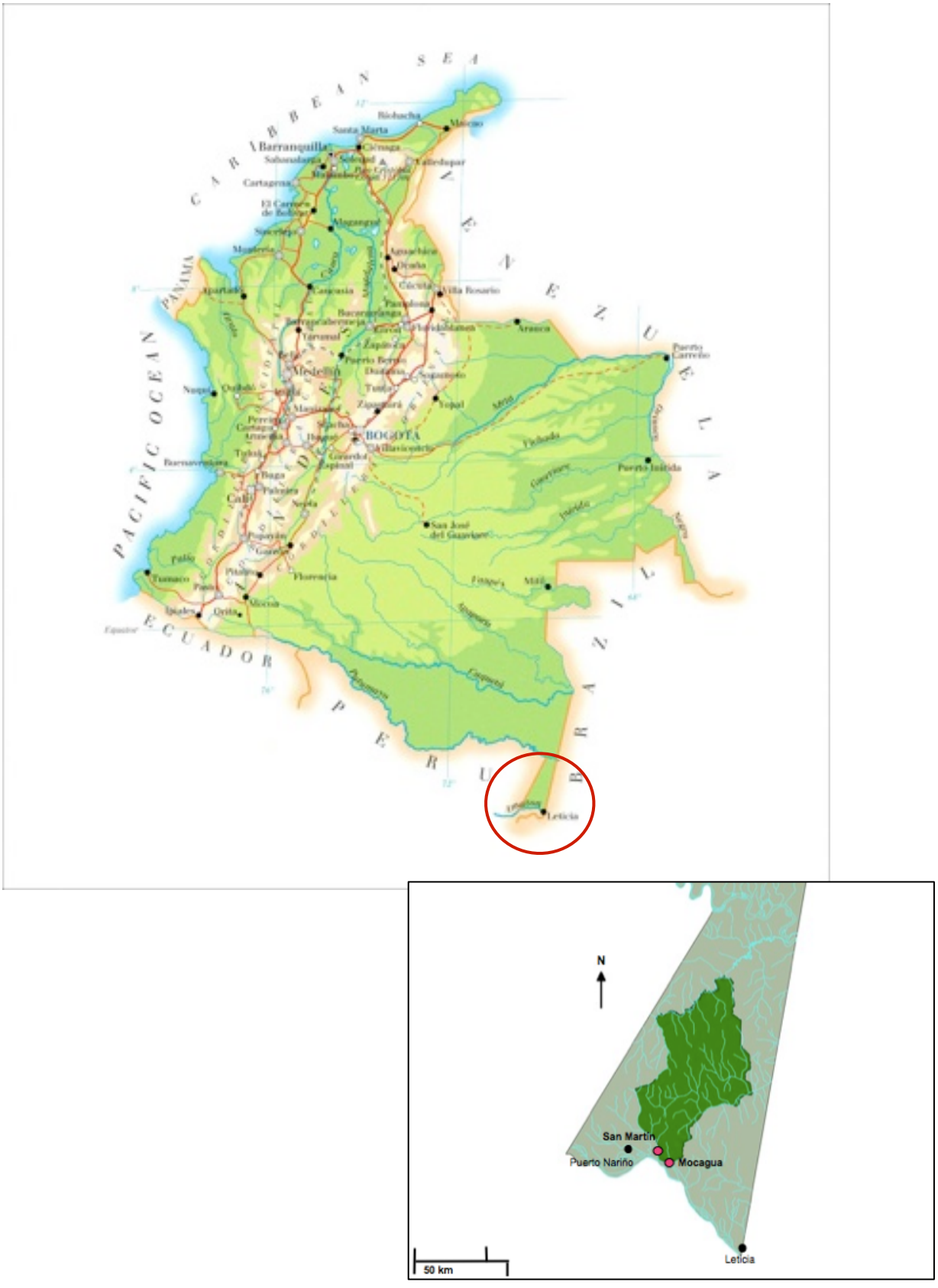

Figure 1.1 Amacayacu National Park, The Colombian Amazon (3°02'-3°47' S, 69°54'-70°25' W)

In-depth census work by Uetz *et al.* in 2005 suggests that ANP is home to four caiman species, one of which is the planet's largest; the black caiman (*Melanoschus niger*), five turtles including the 'mata-mata' (*Chelus fimbriata)*, the yellow-spotted Amazon River turtle (*Podocnemis unifilis)*, the yellow-footed tortoise (*Chelonoidis denticula*) and the 'charapa' freshwater turtle (*Podocnemis expansa*). Several venomous and non-venomous snakes, including the bushmaster (*Lachesis muta*), the coral snake (*Micrurus surinamensis*), the anaconda (*Eunectes murinus*), the Amazonian tree boa (*Boa canina)* and the boa constrictor (*Boa constrictor*) have been identified in ANP. Amphibians include the 'sapo walo' (species unknown) and the flat-bodied 'sapo cururú' (species unknown) [Uetz *et al.* 2005]. Given the extent of the Amazon's water network a rich aquatic life also resides here. The manatee (*Trichechus inunguis*), the grey 'tucuxi' river dolphin (*Sotalia fluviatilis*) and the pink '*boto*' (*Inia geoffrensis*) are all endemic to the region, as well as a plethora of freshwater fish including the endangered 'pirarucu' (*Arapaima gigas*), pirhana (*Pygocentrus nattereri*), dorado (*Salminus brasiliensis*), sabalo (*Brycon melanopoterum*), palometa (*Mylossama aureum*), red snapper (*Lutjanus campechanus)*, lisa (*Leporinus spp*.), electric eel (*Electrophorus electricus*) and stingray (*Potamotrygon spp.*) [*ibid.*].

The forest landscape in ANP ranges from 80-200 metres above sea level and receives an annual average rainfall of 3,270 mm; approximately 266 mm of rainfall per month. Long-term data indicate August is typically the driest month with an increase in rainfall from September until April, however the impacts of climate change have seen a systematic rise in these figures more recently [Rudas *et al.* 2005]. Flooding has damaged crops, destroyed people's homes and made forest resources inaccessible. In 2009 heavy rainfall was recorded throughout with water levels reaching their highest in 20 years. In 2010 the region experienced its hottest dry season in 40 years [TBI 2008]. These unforeseen events have created a number of concerns locally and are expected to cause further unpredictable environmental changes [*ibid.*].

1.5.3 Sacred sites and traditional practices

Extensive research by anthropologists on traditional resource management among indigenous peoples, and the social and cultural systems that regulate resource use, has been carried out [Burgess *et al*. 2005; Wadley and Colfer 2004;

Kimmerer and Lake 2001; Yibarbuk *et al*. 2001; Berkes 1998; Rival 1998; Stevens 1997; Balée 1994; McNeely *et al*. 1990; Poole 1989]. Refraining from hunting in certain patches of territory associated with spiritual taboos appears to be common practice (e.g. Iban hunters in West Kalimantan, Indonesia, Wadley and Colfer 2004). Read *et al.* [2010] determined that among the Guyanese Rupununi most hunting sites occurred at least 10 km from sacred areas, which proved beneficial to the maintenance of a species rich ecosystem. In some countries, these traditional practices are validated through legal systems which recognise their cultural and ecological significance [Dudley *et al*. 2009; Bhagwat and Rutte 2006; Wadley and Colfer 2004]. The Tikuna population also protect sacred places and spiritual sites in the forest, commonly mineral licks, or 'salados′ [Cabrera 2012]. These are especially significant as spaces for cross-species communication [detailed in **Chapter 5**]. When protected by the shaman, these areas offer a safe space for animals to mate, give birth and raise their young. With the dissolution of shamanism however, some people now hunt in these areas. Additionally, *salados* are favoured hunting grounds among those people who gain access to indigenous territories from outside the community. These changes, among others, have the potential to significantly diminish local wildlife populations that were previously sustained [Fragoso 2013 cited in news.stanford.edu/pr/pr-biodiversity-remote-amazon- 020513.html].

The EU and international organisations, UNESCO and The World Bank support the preservation of sacred sites, based upon the grounds that they represent important habitats for wild animal populations. The definition provided by the International Union for Conservation of Nature (IUCN) reads, "*Sacred sites* are *areas of land or water having special spiritual significance to peoples and communities*". The current operational description adopted by The World Bank recognises that these areas can be categorised according to specific characteristics, based upon a stem definition similar to that used by the IUCN: "*A sacred site is a place in the landscape, occasionally over or under water, which is especially revered by a people, culture or cultural group as a focus for spiritual belief and practice and likely religious observance"* [Thorley and Gunn 2008]. According to The World Bank a sacred site must revere additional characteristics distinguishable by at least one feature from a list of 19 specific and detailed attributes which include: i) "*It [the sacred site] is a specific focus within a wider and possibly*

dynamically interconnected sacred landscape"; ii) *"It [the sacred site] is recognised as carrying special manifestations of wildlife, natural phenomena and ecological balance";* iii) "*It [the sacred site] is recognised as the dwelling place of guardian or 'owner' spirits which care for and oversee the site and possibly its wider environments";* iv) *"It's [the sacred site's] spiritual forces or 'owner' spirits are in a mutually respectful dialogue with local people with specialist knowledge acting as guardians or custodians, who play important roles as mediators, negotiators or healers between the human, natural and spiritual dimensions*"; v) *"It [the sacred site] is a cultural sacred-secret, with its location and/or specific religious function only known to a limited number of people";* vi) *"It [the sacred site] is a special place where relationships, both interpersonal and throughout the whole community, can be expressed and affirmed, often through a specific form of observance, e.g., prayer, songs, chants, dance, ritual or ceremony"* and; vii) *"It [the sacred site] is a place especially associated with resource-gathering or other key cultural activities, e.g., gathering medicinal plants or material for sacred or ritual ceremony or objects, fishing, hunting, cultivation, burial of ritual objects, giving birth".*

Despite the attention paid to establishing a globally acceptable classification system for areas of spiritual importance in indigenous territories, it has been suggested that labelling these spaces as "sacred sites" is misrepresentative of their local significance. This is because sacred places often embody the surrounding environment thus forming what could more accurately be described as a "sacred landscape." Thomas F. King [cited in Carpenter 1998] wrote; "*Years ago several [Native American] tribal elders convinced me that, 'sacred site' is a misleading term. 'To you' they said, 'it means a particular place...What's spiritual to us is a lot bigger. Everything's got a spirit, and you've got to respect that spirit. You talk about 'sacred sites' and people think there's just a few of them that you can put on a map. That's not the way it is*'." Other critics suggest that the use of the word "sacred", which arises from the Western term 'sacrosanct' meaning 'holy', contradicts local descriptions. Indigenous peoples talk about these areas as being "*spiritually alive*", "*culturally essential*" and "*where inter-species social meetings and communication between beings take place"* [Carpenter 1998]. More than this, indigenous societies transform natural environments into historical text by inscribing ritual power and mythical knowledge to landscapes (e.g. The Yanesha, Santos-Granero 1998).

1.5.4 Threats to local biodiversity

Alongside the partial success of environmental management in Colombia, the Amazon's natural resources have been rapidly depleted because of improved access to tropical forest and the prohibited trade of endangered wildlife. Adding to the problems are exploitative industries such as commercial logging and hunting, petroleum exploration, dynamite fishing, cattle farming and dredge mining for gold. In the late 1960s Colombia was the main exporter of neotropical primates to overseas markets which drastically degraded nonhuman primate populations [Mittermeier *et al.* 1998]. This decline contributed to current prohibitions which restrict the keeping of tropical birds and animals to indigenous communities, and the use of their feathers and parts in traditional crafts and medicines at a subsistence level [Matapí and Yucuna 2008]. Budget cuts and time limitations have meant Park staff have been unable to enforce many of the regulations on resource use however, and the illicit trade of wildlife and cedar wood (*Cedrela spp.*) has destroyed huge areas of forest in ANP [PNNA 2006]. Park authorities and local people are frequently involved in social and political ties which complicate things further. Maldonado *et al.* [2009] reports that until recently, influential authorities were paying salaries to local people to help capture night monkeys (*Aotus* spp.) for biomedical research. Huge pressure was put on local workers. However the work, while somewhat risky, was seen as a way of earning good money.

1.5.5 Quotas and regulations

The Tikuna have hunted and gathered sustainably for generations however recent surveys suggest that because of habitat destruction and illegal exploitative activities, even on a small scale hunting by local people in ANP has long-lasting detrimental effects on faunal populations [Maldonado 2012]. Recommendations have been made for the Tikuna to seek out economic alternatives to hunting and fishing [Maldonado 2012; Robinson and Bennett 2000; Robinson and Bodmer 1999]. Guidelines suggested for Mocagua and San Martín's territories have been imposed as part of a preliminary resource management plan in ANP [**Table 1.1**]. These quotas were established during discussions which took place between the ANP director, park staff, researchers and representatives from Mocagua, San Martín, Palmeras, Macedonia, El Vergel and Zaragoza in 2001, 2003 and again in 2006.

Table 1.1 Quotas and regulations proposed for Mocagua and San Martín as part of a preliminary resource management plan following meetings between the indigenous communities and ANP held from 2001-2003 and in 2006 [PNNA 2006]

Mocagua's territory	San Martín's territory
It is forbidden to hunt the woolly monkey (*Lagothrix lagothricha*), the white-fronted capuchin (*Cebus albifrons*), the wattled curassow (*Crax globulosa)* and the nocturnal curassow (*Nothocrax urumutum*).	The hunting of all species (with the exception of manatees) can take place for subsistence use but must not occur in close proximity (<1 km) to the village.
The paca (*Agouti paca*) and black agouti (*Dasyprocta fuliginosa*) may not be hunted when they are in season between March and May or September and November.	The commercial sale of most types of bushmeat is permitted within and between communities only. Caimans, primates, tortoises and capybaras must not be hunted for local or commercial sale.
The maximum number of tapir (*Tapirus terrestris*) killed by a hunter in one year must not exceed two.	The maximum number of tapir (*Tapirus terrestris*) killed by a hunter in one year must not exceed two.
No more than one capybara (*Hydrochaeris hydrochaeris*) can be hunted per year for 'pest control' purposes only.	Only people from San Martín and Palmeras may hunt within San Martín's territory. No one may hunt at mineral licks (sacred sites). Public access to sacred sites is denied.
It is prohibited to capture or collect eggs from the South American River turtle (*Podocnemis expansa*).	Up to 30 kg of meat may be sold to the Catholic Boarding School in Puerto Nariño in exchange for schooling fees, once permission has been granted by San Martín's *Curaca.*
On Mocagua Island the use of shotguns is only permitted for protection against predators, and must be authorised by the *Curaca* and *Cabildo* beforehand.	The trade of all live wild animals is forbidden.
The hunting of bird and mammal species is forbidden on Mocagua Island, with special emphasis on the manatee (*Trichechus inunguis*), the Amazon River dolphin (*Inia geoffrensis*), the grey river dolphin (*Sotalia fluviatilis*) and the wattled curassow (*C. globulosa*).	

While some criteria were proposed by local people and based upon TEK (e.g. *"No one may hunt at mineral licks [recognised as sacred sites] and public access to these sites by foreigners is denied"*) others were extrapolated from sustainability measures (e.g. "*Up to 30 kg of bushmeat can be sold to the Catholic Boarding School in Puerto Nariño in exchange for schooling fees, only once permission has been granted by the Curaca"*). The plan has however been criticised both for: i) failing to contend with indigenous beliefs about territory, ancestry and the origin of the Tikuna people and ii) not using up-to-date scientific data on wildlife density populations [Maldonado 2010: 35-37]. Key information such as the location of previous Tikuna settlements and the concentration of important natural resources were also disregarded.

Despite initial tension between the Park authorities and local communities, because of efforts to impose natural resource management, a collective decision to stop hunting woolly monkeys (*Lagothrix lagothrica*), white-fronted capuchins (*Cebus albifrons*) and curassows (*Crax globulosa* and *Nothocrax urumutum*) took place in Mocagua in 2003. This was influenced by the persistent efforts of American biologist Dr. Sara Bennett, and the research of Dr. Angela Maldonado. Dr. Sara Bennett has worked in the Colombian Amazon, with a specific focus on primate conservation for over three decades. She is a recognised expert in primatology with a specific interest in the woolly monkey (*L. lagotricha*). Her long-standing working relationships with the environmental authorities, National Parks system and indigenous communities have enabled her to develop an effective and sustainable role in the area. Dr. Bennett has facilitated a locally run initiative to reintroduce the wattled curassow to Mocagua Island[7] [Bennett 2003]. She has also successfully managed 'The Animal House', in collaboration with local indigenous partners since 2005 and has worked with local people and the relevant authorities to establish an effective rescue, rehabilitation and release programme for orphaned wildlife.

'The Animal House' was set up as part of Fundacion "Maikuchiga", which means "The Monkeys' Story" in the Tikuna language. Maikuchiga's mission is to facilitate and enable law enforcement which prohibits the trafficking of wildlife. With this aim

[7]Part of Mocagua's territory stretches to the Island of Mocagua about 1 km offshore from the mainland where the community is situated. The island is used for cultivation only, although problems with water-logged soils and flooding make it difficult to grow foods [Male, personal communication, Mocagua, May 2007].

comes the inherent and complex dilemma of how to deal, in an ethical manner, with the animals confiscated from the illegal trade. Historically, in the Colombian Amazon, neither the conceptual nor logistical systems required to achieve this existed. This meant that despite the law dictating the illegal commercialisation of wildlife, no mechanisms were in place to realise its practical enforcement. In 2003, with advice and support from Dr. Bennet local Tikuna communities reached an agreement that they would no longer hunt threatened species and made the explicit decision to refrain from hunting large primate species. Mocagua were the only community to give the ban on monkey hunting official status in their community. From this decision the idea to create 'The Animal House' was borne. Since 2005, Corpoamazonia (the local authority responsible for the enforcement of environmental regulation in the region), ANP and The Maikuchiga Foundation have collaborated in the development of a care and rehabilitation programme for decommissioned wildlife. An extremely important aspect of this programme is to ensure the stories of the individual animals who are rescued and rehabilitated are linked to the wider issues of biodiversity conservation, through environmental education and scientific research. This fosters an understanding of the long-term issues related to the illegal trade of local wildlife among local people and tourists visiting the area.

Both, Dr. Bennett's work and Dr. Maldonado's research have educated local people about the impact of hunting and harvesting wild animals from the forest and river. Maldonado's [2012] report on hunting rates in Mocagua and San Martín suggests that hunting takes place three times less frequently in Mocagua than it does in San Martín. The economic benefits gained through jobs in research and tourism have played a significant role in enabling Mocagua's decision to implement protocols to reduce hunting rates. Indeed, Maldonado describes the community as, "*An example of community based conservation success where tourist-based activities have permitted the community to switch from a reliance on natural resources to a dependency on bought goods*" [Maldonado 2010: 136]. Since these findings were published however, and since my research was carried out, the ANP's tourist lodge and restaurant closed down causing the temporary suspension of many of the financial benefits previously received by people in Mocagua. Consequently, people have less opportunities to earn money and buy meat instead of hunting. They also need to generate another source of income to

pay for school fees and uniforms for their children. The situation is being carefully monitored by the Park but the long-term implications of these recent changes are currently unknown.

1.5.6 Special management in overlapping areas

Before the endorsement of indigenous *resguardos* in Colombia in the 1970s Tikuna villages were regarded as no more than temporary settlements, which meant eviction could take place at any time [Franco 2006]. The Tikuna people were cautious about being involved in foreign projects in fear of compromising their land rights and access to resources. Consequently, mechanisms were put in place to build trust and cooperation between researchers and locals. A number of collective projects serving conservation objectives and the economic interests of local people were designed, and an agreement was reached between the National Park authorities and local communities, that research, tourism and conservation could only take place with the full consent of local people. Many local people are unhappy about the intensive harvesting of resources in their ancestral lands and feel dissatisfied with the regulations that exist to control these activities.

Furthermore, uncertainties over land ownership and delimitation in shared areas create conflicts concerning access to resources between local communities and Park authorities in ANP. For example, San Martín is situated in the Tikoya indigenous reserve (1,398 km^2) and overlaps 128.9 km^2 of land governed by the National Park. This includes the non-indigenous town of Puerto Nariño where illegal cedar extraction and commercial hunting takes place. Just over 60 km^2 of Mocagua's territory lies within the Park's boundaries, and is shared in part with the indigenous community of Palmeras. Mocagua Island is used for cultivation by people from Mocagua, Macedonia and El Vergel [PNNA 2006]. The issue of shared territory is further complicated by disagreements over harvesting quotas between indigenous people and Park officials [Ungar and Strand 2012]. In response to these conflicts, in 2006 a project was initiated by the Park director and staff from ANP with the objective to produce collaborative management plans in shared areas (Regimen Especial de Manejo, REM). REM aimed to regulate the use of natural resources and integrate community needs with government objectives [Franco 2006 and the project brought about some positive changes, including communities regaining the right to hunt for subsistence purposes. When

presented by UAESPNN[8] representatives however, the project did not gain approval from local people, who feared this was yet another ploy to further limit their people's freedom to conduct their traditional customs and practices [Gruezmacher 2008].

1.5.7 Economic initiatives

Historically the Tikuna showed high levels of mobility and sustainable resource use. Early Tikuna populations were nomadic hunter-gatherers that moved in response to patchy resource distribution and changing market demand for extractive products. Since becoming established in permanent settlements however, the pressures exerted on local resources have increased and this has forced the Tikuna to change their extraction techniques and economic practices accordingly. Indeed, Newing [2009] suggests that community conservation is often incompatible with indigenous land use and settlement practices, as the former is based upon fixed land use and resource rights whereas the latter relies on high levels of flexibility and adaptation. Some major transformations occurred over the past century as far as settlement patterns and resource use are concerned. European colonisation saw the relocation of a number of indigenous communities. The poor soils of the upper Amazon, which are less suited to agriculture, influenced a movement towards the richer soils of the flooded lowland regions. Santos-Granero and Barclay [2000] describe a deep-seated notion among early hunter-gatherers that cultural mobility supported their romantic ideas associated with exploration and adventure. During the rubber boom, Santos-Granero and Barclay [2000] observed interesting differences between the two dominant rubber species in the ways they were extracted and traded by local people which consequently influenced indigenous settlement patterns. Similarly complex social, economic, ecological and cultural factors associated with mobility, food production, law enforcement and trade, have all influenced extraction patterns throughout history in Western Amazonia.

In the Amazonian Trapezium region a war between Colombia and Peru erupted in 1932, causing the Tikuna to leave the left bank of the Amazon River for the right. In the 1940s farmers and city dwellers began to colonise the area. In addition a

[8]The Colombian National System of Natural Parks (Unidad Administrativa Especial del Sistema de Parques Nacionales Naturale).

number of money making initiatives took place in ANP during the last one hundred years. In the early 1900s the Tikuna were involved in rubber extraction, and the sale of live animals and their skins for export to international markets [Riaño-Alcalá 2008]. In the 1950s a bonanza in the fur trade was a major contributor to the local cash economy. Once big cat, otter and mink populations plummeted below profitable levels commercial bushmeat hunting became a primary financial earner [Van Leijsen and Vleut 2005]. In the 1980s the cultivation and trafficking of cocaine brought significant changes to the region as huge amounts of money entered relatively isolated communities. Enforcements by the Colombian Army caused the drugs trade to fragment and the cultivation of cocaine moved out into the countryside [Franco 2006]. Nowadays, the sale of meat and fish also provides an income, the most expensive “Pirarucú” (the giant fish of the Amazon River and an endangered species) earning up to £2 a kilogram ($ COP 8000) [Chauvin 2012]. Small-scale economic opportunities associated with research, conservation and tourism exist but their success is highly dependent upon accessibility and the receptivity of local people.

1.5.8 Tourism in ANP

Ecotourism was welcomed into ANP under the premise of attracting visitors to the region and creating job opportunities for businesses and the local people. While money is no new concept to people in Mocagua and San Martín, the intensive development of tourism in the region since 2003 has provided numerous jobs in Mocagua, and caused a dramatic shift in how people relate to and utilise wildlife and engage in their environment. Regardless of these expectations in her 2008 report Gruezmacher states that resource management is “*[L]imited to Western ideals that do not consider traditional indigenous Tikuna principles*.” Indeed, just two years earlier, in 2006 the ‘*Tatatao* Project*’* showed that while ecotourism had been sold as a promising socio-economic enterprise to local people it brought with it negative cultural and societal manifestations. The Tikuna were forced to adjust their lives to satisfy the tour companies and meet the expectations of the tourists [Ex-researcher from the *Tatatao* Project, February 2007]. Tourists, it was felt, were being sold an “authentic traditional indigenous experience” by travel agents, however this took coordination between the communities and tour companies which compromised local people’s daily routines.

Five years later and little has changed; the following testimonial was left by a tourist following her trip to ANP in 2012 [Trip Advisor website, March 2012]:

"*We witnessed traditional fishermen, Indian villages and were surrounded by rainforest, better than we had hoped...The hotel arranged pink dolphin viewing for us on request...we did a four hour hike through the jungle with a real Indian guide...The hike ended in an Indigenous village. They fed us lunch and we bought some handmade necklaces and baskets from them to take home as souvenirs...In a word, AUTHENTIC*!" [Anon. 2012].

During the creation of the Tourist Centre in ANP in 2003 (including a tourist lodge, restaurant and visitors centre) local people were trained as interpreters and guides. Their roles included leading tourists on walks through the forest, taking them to visit 'The Animal House' and local communities, and organising dolphin viewing and tree climbing expeditions. While the number of tour operators increased from 16 to 28 a monitoring program to measure the project's impact revealed that the number of annual visitors nearly doubled from 4,575 to 8,857 people in five years [A. Barona cited in Verner 2009]. The Colombian resort chain Decameron bought the ANP Tourist Centre in 2008. Agreements were drawn up between the Park and Decameron to ensure all services continued to be operated with the involvement of the local communities. This change however meant that local people were no longer included in pre-trip arrangement processes. Instead, visitors were sold packages by Decameron's tour operators in the city whilst onsite management was led by Decameron staff whose objectives were to capitalise on the Park's biological and cultural wealth. I conducted my research in Mocagua and San Martín during this period and saw how local people adapted their lives to these new economic and social circumstances. Two years after the study had ended the Tourist Centre was closed down by Decameron. Tourism in ANP was deemed 'unprofitable' by the Decameron resort chain and local people lost their jobs with no contracts to guarantee the payment of their owed salaries [D. Artistizabal, personal communication, 12 October 2012]. Future research in the region will undoubtedly report the impact of these changes and the views that the Tikuna now have about conservation, tourism and living in a National Park.

Despite reports about the negative aspects of intervention in ANP other projects have also been implemented in the region which have produced positive results and benefitted local people and wildlife. ANP staff have also worked with indigenous people on a number of collaborative ventures with varying success. These included the manufacturing of non-timber forest products, tourist development, sustainability and education projects and rearing wild animals as a food source. Additionally, the Dutch NGO Tropenbos International (TBI) has been supporting local people in ANP to establish grassroots production industries since 1999. Ecotourism and the sale of locally made handicrafts have been flagged as profitable economic industries for the Tikuna [Gruezmacher 2008]. TBI's strategic plan for 2011-2016 aims to "*support the better management and governance of tropical forest resources in a range of countries by supporting dialogue and development in the common interest of developing countries*". It was created in 1986 in response to increasing concerns about the disappearance and degradation of tropical rainforests worldwide and they suggest that, "*well-managed forests can simultaneously contribute to the objectives of alleviating poverty, providing ecosystem services and fostering sustainable economic development*". Other initiatives range from greening supply chains to improving forest governance and compensating forest owners for carbon sequestration services.

1.6 The Tikuna and other populations

1.6.1 Indigenous populations in the Amazon

Indigenous societies are defined as: i) "*peoples in independent countries whose social, cultural, and economic conditions distinguish them from other sections of the national community*; ii) *peoples whose status is regulated wholly or partially by their own customs or traditions or by special laws or regulations*; iii) *people who are regarded as indigenous on account of their descent from the populations which inhabited the country, or a geographical region to which the country belongs, at the time of conquest or colonisation or the establishment of present state boundaries*; and iv) t*hose who irrespective of their legal status, retain some or all of their own social, economic, cultural and political institutions*" [IUCN 2013]. At the start of the 21st century estimated numbers of indigenous people ranged from 300 million [WGIP 2001] to 350 million [Coates 2004] which equated to just under six percent of the world's population. Their communities were thought to comprise at least 5,000 distinct peoples in more than 72 countries and account for 70% to 80% of global cultural diversity [Coates 2004]. In Colombia, indigenous societies occupy 365,000 km^2 of land in 567 *resguardos* which accounts for nearly 25% of the country's national territory [Lozano 2005].

Latest estimates in the Colombian Amazon suggest a human population density of approximately 3.3 inhabitants per km^2 most of which are indigenous and other traditional peoples [Franco 2006]. More recent figures for indigenous peoples however are unavailable, although it is reckoned that just one percent of Colombia's population (of around 48,300,000 people) still adhere to indigenous religions [http://countryeconomy.com/demographypopulationcolombia]. Before Spanish colonisation the country was home to a far more populous number of indigenous groups [Jaramillo 2003]. The Tikuna, along with many other native peoples, lived mainly in small sparse communities with low population densities in the upland areas of the Colombian Amazon [Beckerman 1993]. The lowland Cambeba people had the densest populations until the late Pre-Columbian era. The Cambeba's numbers dramatically reduced following The Columbian Exchange (following the voyage to the Americas by Christopher Columbus in 1492) which saw the trade of many resources between the East and the West, as well as the introduction of exotic diseases [Crosby 2003]. Catholic missionaries

arrived during the late 1600s which led to further population decline through a smallpox epidemic [Nimuendajú 1952]. Lowland settlements later diminished as a result of slave raiding and migration, which gave the Tikuna an opportunity to inhabit areas of nutrient rich *várzea* floodplains in the South that were previously Cambeba territory [Crosby 2003].

1.6.2 Tikuna kinship system and social structure

The Tikuna ethnic group belongs to the Tukano linguistic family; traditional inhabitants from the Amazon region who roamed territories covering the Colombian, Peruvian and Brazilian inland forest. With over 400 years of contact the Tikuna were one of the first major Amerindian tribes discovered by the early Spanish and Portuguese conquistadors [Franco 2006; Lopez 2000]. They have faced violence from loggers, fishermen and rubber-tappers. Together with conflict from non-indigenous societies the nomadic Tikuna fought over access to land with other indigenous groups until the mid-1700‘s. The 1988 Helmet Massacre in Brazil was said to have been "*An attempt to deliberately destroy the entire ethnic group*" [www.brazzil mag.com]. The majority of the Tikuna population now resides along a 600 mile stretch of the Amazon River and is believed to be one of the most numerous tribes in the Amazonian region [Franco 2006]. Part of the South American indigenous people cluster of which the global population is 65,900 the latest census data suggest an estimate of 36,000 Tikuna living in the Brazilian Amazon, with an additional 6,000 in Colombia and 7,000 in Peru [PeopleGroups. org 2000 - 2014].

The Tikuna have been described as forming a social unit of “one culture, one language and one territory” [Cardoso de Oliveira 1970]. Their kinship structure make up a network of kin relations both internally within the local group and externally with neighbouring groups. Cardoso de Oliveira’s early ethnography of the Tikuna reported that they were organised into clans and moieties[9] which governed daily behaviour and formed the basis of Tikuna identity [Cardoso de Oliveira 1970]. Clans were identified by specific names of birds, insects, mammals, and plants. Those clans identified by a bird's name constituted one moiety, the ‘Feather people’, while all other groups formed the second moiety, the

[9] When a society is divided into exactly two descent groups, each is called a *moiety*, after the French word for half.

‘Non-Feather people’. Children belonged to their father's clan and their personal names were emblematic of this [*ibid.*]. The basic rule governing Tikuna moieties was exogamy whereby marriages had to take place between members of different moieties. These clans still exist in modern Tikuna society. However, with the increase in mixed relationships this custom is weakening as children born of a Tikuna man or women and a non-indigenous husband or wife fall outside of the clan system [Reyes and Gubier 1996].

The traditional Tikuna social organisation is ‘Dakota-type‘ which is the most widespread and typical form of patrilineal organisation [Cardoso de Oliveira 1970]. It is widely characterised by non-sororal polygyny whereby a man may have multiple wives who are not related to each other. Family organisation is either the independent polygonous or patrilocal extended type in which married couples live with or near the husband's parents. Among the Tikuna this extends outwardly to patri-clans[10], by the patrilineal extension of incest taboos, and by bifurcate collateral[11] or bifurcate merging[12] terms for aunts and nieces [*ibid.*]. According to Nimuendajú [1952: 64] inheritance is from father to son and from mother to daughters. Again, as living conditions and lifestyle evolved, the Tikuna social system did too. Kinship ties are still strong within contemporary Tikuna society. Neighbours are often related and it is common that married children live no more than one or two houses away from their parents’. Such family configuration allows practices related to food acquisition to be preserved to a certain degree, including food sharing and the gift economy at a family level. Relatives are often gifted with food products coming from the *chagra*[13]*.* Traditional reciprocity activities such as the *minga* are still practiced although less often than previously. The *minga* is a social working party that occurs when a member of the community requires collective labour to help complete a particular task. During a *minga* people from the same community work together to create a *chagra,* build a house, carve a

[10]In a patri-clan, membership is determined by patrilineal descent from a common ancestor [Keesing 1975].

[11]A bifurcate collateral system differentiates the uncles and aunts both from the parents and from each other. ‘Collateral’ refers to the siblings of lineal relatives (parents, grandparents) and their descendants [Keesing 1975].

[12]Bifurcate merging identifies collateral relatives with lineal relatives of the same sex and generation when the connecting relative is of the same sex, but distinguishing them when the connecting relative is of the opposite sex. In a bifurcate merging terminology a father's brother would be identified as father but a mother's brother as uncle [Keesing 1975].

[13] The *chagra* is the family allotment or garden on the outskirts of the community where people cultivate land and grow staples such as yuca and plantain.

canoe, harvest crops or cut firewood. Normally food and the alcoholic yuca drink '*masato*[14]' are offered to the workers in exchange for help. Nowadays, in order to carry out a *minga* it is mandatory to offer highly valued foods such as chicken or bushmeat, otherwise people will not attend [personal observation 2007].

Formerly, the preferred form of marriage among the Tikuna was for the maternal uncle to marry his niece. However, social practices that do not pertain to traditional Tikuna culture are now practiced within the communities, including monogamous marriages. The most common form of marriage today is between people of the same generation. Cross-cousin marriage, which was permissible under traditional rules, was considered incestuous by the Catholic missionaries. The nomadic Tikuna lived in temporary communal settlements but this lifestyle was replaced by a single-family housing plan organised around a central nucleus following a government mandate in 1974. The *maloca* was a large, multi-family circular dwelling referred to as a roundhouse. Despite being a patrilocal society the *malocas* were ruled and considered the realm of the female, passed from mother to daughter [Nimuendajú 1952: 11-18]. The *maloca* played a vital role in establishing social hierarchies as well as supporting equality and interdependence between individuals and families [Hugh-Jones 1995; Von Hildebrand 1987]. The design of the *maloca* was drastically altered with the arrival of mosquito nets. Once it was no longer necessary to build walls *malocas* became open, rectangular shelters. Later, as the Tikuna spread out along the Solimoes many found their dwellings were often flooded and so raised their houses up on stilts [Nimuendajú 1952: 11-18]. While the original *maloca* reflected the communal hunter-gatherer lifestyle, the government's modern settlement plan (single family occupancy of a dwelling) meant they could more easily monitor each Tikuna family and allocate state healthcare and formal education [DANE 2005].

1.6.3 Community structure and hierarchy

Changes to the Tikuna community and housing structure led to changes in the traditional kinship system both of which had consequences on the Tikuna's relationship with their natural environment. It is well known that local resource use in permanent settlements has more of an impact on wildlife populations than

[14]*Masato* is an alcoholic beverage made from fermented yuca said to provide strength and energy. It is drunk during celebrations, rituals and *mingas.*

resource use by nomadic societies [Von Halle and Director 2002]. The acquisition of consumer goods and possessions, human population growth, land scarcity and food shortages are some of the consequences of sedentarisation [Beckerman 1993]. Furthermore, non-indigenous people from the surrounding area moved in to the local villages and began mixing with the Tikuna communities. The result in ANP are randomly constructed communities whose populations are a mix of Tikuna and other ethnic peoples with different migration histories [Ungar and Strand 2012].

As is the policy in ANP the Tikuna have been the subject of a number of development strategies and conservation initiatives. They have gone through a long process of cultural and social adaptation and a restructuring of the Tikuna social organisation has occurred alongside the diminishing of shamanic practices. Mocagua and San Martín have a social and political hierarchy composed of an elected *Curaca.* In the past, the heads of large families were the chiefs of their local groups. They were acclaimed as being endowed with magical powers, intelligence, and the ability to deal with strangers. One of their roles was that of counselor. These traditional Tikuna chiefs have since been replaced by *Curacas* who adopt the role of spokesmen vis-à-vis official authorities, mediators between their own community and others, and organisers of collective work. The *Curaca* represents the community at a governing level and oversees all local and regional meetings. He is closely assisted by the *Cabildo* who advises him, alongside a democratic decision-making process involving the rest of the village. Ultimately it is the *Curaca* who adjudicates on community matters and circumstances in the village are highly dependable upon who this is. If the rest of the community are dissatisfied with his governance however, they may request him to stand down and a new person be appointed. I witnessed discord between the *Curaca* and the community in San Martín when a decision to ban further research from taking place was passed by the *Curaca* and his advisors, despite objections from the rest of the community. It appeared that most people were afraid to speak up however as the *Curaca* and *Cabildos* were from a powerful family of high status. Although the *Curaca* remained in power, the decision created a clear divide in the community [**Chapter 6, section 6.1.1.1**].

1.6.4 Ancient beliefs and religious influence

It is said the most important forms of social control in traditional Tikuna society are gossip, social alienation, and sorcery through shamanism [Cardoso de Oliveira 1970]. The shamanic institution among the Tikuna, however, is disappearing because of intervention by Catholics and Protestants. Ancient Tikuna religion, some portion of which remains in the communities of Mocagua and San Martín, teaches that the world is controlled by spirits and forces which determine the course of everyday events, while the Tikuna creation myth expresses the fundamental characteristics of the Amazon ecosystem [Erikson 2011]. The Tikuna believe that life is made up of three worlds: Heaven, Earth and Hell, and everything has two souls. *Ta'e* is the divinity who inhabits the World Above, and who gives the Tikuna their souls. *Nutapa* was the first Tikuna man from whom the mythical brothers and their sisters were born. *Me'tare* was a powerful shaman who conducted the first female initiation ceremony, The *Pelazón.* This ritual grants the rites of passage to young Tikuna men and women to signify their coming of age[15]. The most important beings in Tikuna mythology are *Yo'i* and *Ipi*, two brothers who function as cultural heroes and who confront several demons of the Intermediate World and the World Below. The Tikuna believe in two kinds of beings: mortals and immortals. Immortals never die because they go to enchanted places where life is eternal. Although the locations of these places are known to the living, no one but the Shaman can reach them. At the moment of death the two souls of mortals set out in different directions. One soul goes to the World Above, while the other remains where the dead person lived [Erikson 2011].

The Amazonian creation myth tells that the Tikuna originated from the Eware ravine near the Colombian-Brazilian border [Reyes and Myriam 1989]. In this time the world was a dark place with neither light nor water. In the beginning of creation there was only one single giant tree, the *Ceiba pentranda,* rooted in earth and tied to the sky. The tree was cut and as it fell to the ground light shone onto The Earth and its branches spread to form the winding tributaries of the Amazon River. Its transformation into a great water system and a vast forest landscape caused the world to expand and exist with all its differentiation [*ibid.*]. It is said that several

[15]The *Pelazón* is a traditional ceremony celebrating the development of young Tikuna girls and boys into adulthood. The community dance and sing wearing traditional costumes representing different forest animals, such as '*el mico loco*' ("the crazy monkey") or capuchin monkey. They wear costumes made from natural resources taken from the forest such as birds feathers, seeds, snail shells and cloth made from palm fibres [Prado and Betancourt 2004].

primordial beings attempted to trick and kill predators that caused the fall of the giant tree and the beginning of the world as it is known today. Rival's [2012] work tells a similar creation myth among the Huaorani of Ecuador. She suggests that the story of the giant *ceiba* tree (*C. pentranda*) conveys the knowledge that without trees there would be no life on Earth. Trees provide food, shelter and rain, and depend on a delicate balance between heat, humidity, shade and light. According to the Tikuna creation myth, all that was alive dwelled in the *ceiba* tree. In those times living beings, neither animals nor humans, formed one single group. The only group that stood alone were the birds. Doves were the only game available to hunters, and the two dangerous individuals, Eagle (raw meat eater) and Condor (eater of rotten flesh), preyed on people and doves alike. Rival suggests that the Amazonian myth of origin articulates a powerful message that associates social categories with two distinct natural processes, the aggressive relation between predator and prey on the one hand, and the life-sustaining relation between people and plants on the other [Rival 2012: 135].

The majority of the Amazonian Tikuna population have added Catholicism into their longstanding traditional ceremonies and beliefs as a result of visits by Portuguese and Spanish missionaries. The missions began their evangelical work among the Tikuna during the first centuries of discovery and conquest in the 1600s. The first recorded missionary to arrive in the Amazon was the Spanish priest Cristobal de Acuña in 1641. He was followed by the Brazilian-Portuguese Carmelites in the early eighteenth century and Father Franciscus of the San Ignacio mission in the 1760's [Hugh 1911]. The Church began to build mission schools for indigenous Tikuna children in the 1960s. An incipient messianic movement was founded and propagated by Brother José Francisco da Cruz in the 1980s. This involved almost the entire Tikuna population in Brazil, Peru, and to a lesser degree in Colombia [*ibid.*]. While missionaries discouraged traditional festivities, social practices and animist teachings, they introduced commercial activities such as the sale of animal pelts, and the provisioning of material goods including shotguns, ammunition, Western clothes and medicine [Hill 2002]. For example, the following narrative records one missionary's response following her attendance at a Tikuna *Pelazón* during her visit in the early 1900s; "*Drinking and dancing without stopping; you know that dancing leads to immorality. Those idiots used all that sorcery. The men would drink and dance all night long; then they*

would go and mount the girls and do immoral things" [Muller 1952]. In ANP many inhabitants from Mocagua and San Martín now follow Christianity alongside or in place of their indigenous beliefs and practices, and most children attend the Jesuit mission schools. Today, priests from Loreto, Peru and the Brazilian town of Tabatinga frequently visit indigenous *resguardos* in ANP to conduct Sunday services and collect financial donations for the church from local people.

1.6.5 Mocagua and San Martín de Amacayacu

The degree to which social and cultural transformations take place in indigenous communities is largely influenced by their location in relation to nearby towns and centres of trade. This creates and controls opportunities to earn money and influences the frequency with which indigenous people engage with other cultures. The communities of Mocagua and San Martín have been described as "*Among the least traditional in the Colombian Amazon, close to the city of Leticia and market economy. Most of them do not speak Indigenous languages. However, livelihoods are still largely based on collective work, depending on the products of traditional orchards, fishing and hunting"* [Ungar and Strand 2012: 3264]. This describes a people who, whilst adapting to modern influences, are still dependent on local resources. Indeed, although Leticia is well equipped with a hospital, post office, hotels, shops and restaurants, and most foods and consumer goods can be bought there, few people from Mocagua and San Martín can afford regular trips into town and usually only visit when seeking medical treatment or selling their produce or handicrafts. For this reason the Tikuna still acquire much of their food through hunting, fishing and small-scale agriculture in slash-and-burn patches. These family owned allotments produce starchy vegetables such as manioc and plantain. These are critical as a fallback food to families who rely on hardy staples as their main source of sustenance in times of meat and fish shortages. In addition, excess produce can be sold for cash which contributes towards buying other foods and commodities, and paying secondary school fees.

The main tourist route into ANP is served by a motorboat which leaves the Port in Leticia passes by Mocagua and arrives at the tourist lodge in the visitors centre two hours later. Mocagua is found in the South easterly region of the Park on the main course of the Amazon River next to the ANP visitors centre. San Martín is situated more remotely at the South Western tip along the winding tributary of the

Amacayacu River [**Fig. 1.2**]. While certain researchers frequent San Martín, its relative inaccessibility in comparison to Mocagua means tourists are less inclined to visit. In addition, Mocagua's location means people are able to maintain regular contact with tour operators and Park staff which keeps them informed of employment opportunities as they arise. Poor satellite reception in San Martín makes telephone communication near impossible, so unless locals take the time to visit the Park and speak in person with staff it is relatively difficult for them to keep up-to-date with tourist agendas. Ironically, during Gruezmacher's [2008] study people from San Martín said they felt purposely omitted from the very processes that had been put in place to ensure their collaboration.

Circumstances mean that people in San Martín rely on more traditional skills and crafts to sustain a living. It is the only village for example, where all the families speak Tikuna as their first language. Children in San Martín are brought up speaking Tikuna in the home and the community have made a pledge to employ only Tikuna teachers in the school so that lessons are taught in Tikuna. San Martín is also the only indigenous community in ANP that still carries out the *Pelazón* ritual. The first generation of San Martín's inhabitants to arrive in ANP came from one of the largest most well established Tikuna communities in the region, *Buenos Aires,* located in the North, in the Cotuhe-Putumayo reservation. People from San Martín still make the 48 hour trek through the forest to visit *Buenos Aires* and take part in *Pelazón* ceremonies. By comparison, in Mocagua all but one of the teachers are not Tikuna and few people know how to speak Tikuna (the majority of whom are over the age of 50). This is largely because work opportunities with loggers, miners, and other industries, such as tourism and research, has made Spanish a useful and well established language [C. Panduro, personal communication, 2 June 2006]. Mocagua and San Martín provide an interesting comparison of how two communities, who were at one time relatively similar both culturally, socially and economically, have adapted in very different ways because of their locations and as a result of differing opportunities.

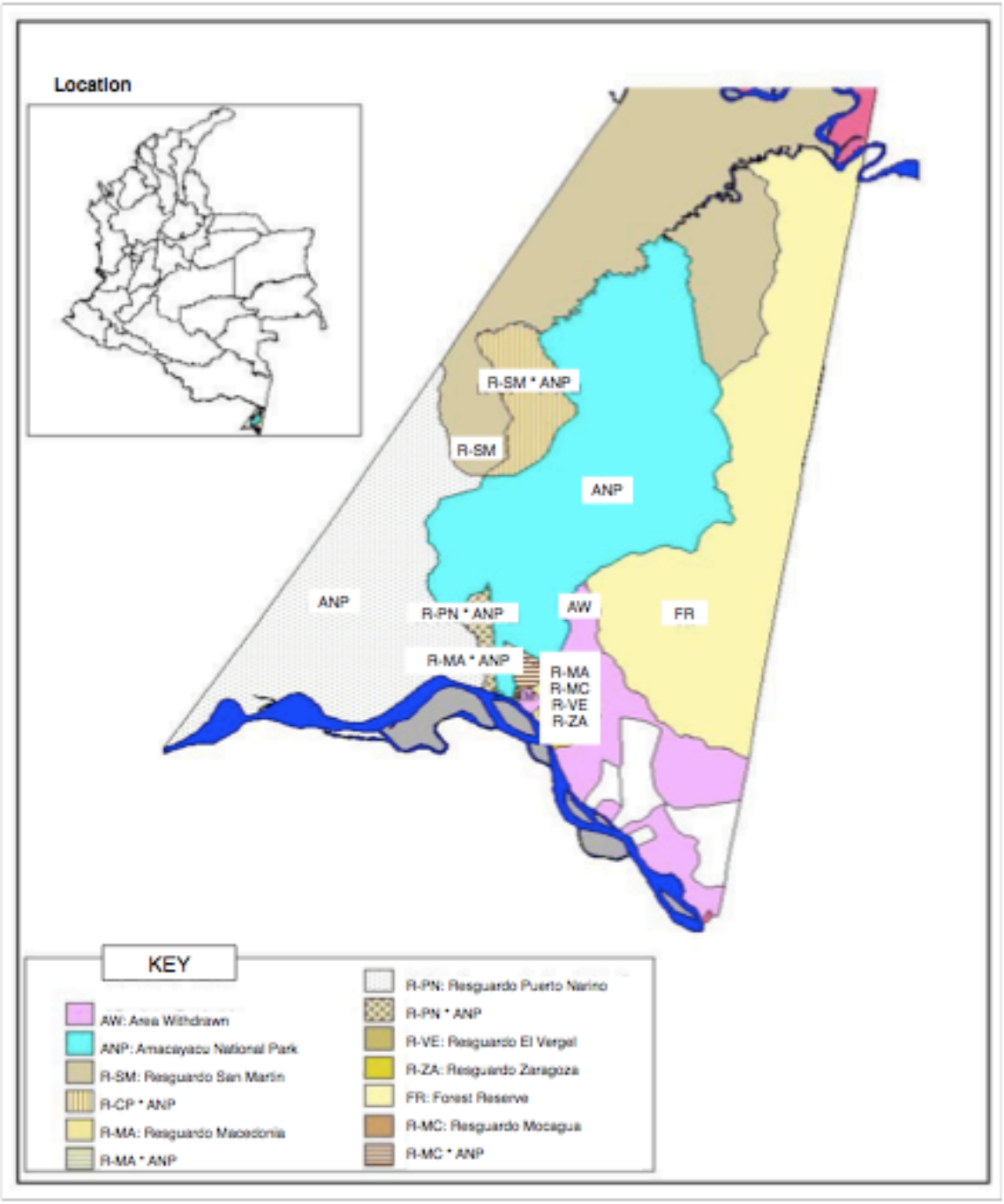

Figure 1.2 Indigenous territories ('resguardos') and Park boundaries in the Amazonian Trapezium, Colombia [Map courtesy of A. Barona]

Chapter 2

Methods and Analysis

Chapter 2: Methods and Analysis

2.1 Using a multi-methods approach

Fieldwork took place in the indigenous Tikuna communities of Mocagua (population=511) and San Martín (population=480) in The Amacayacu National Park (ANP), Colombia. Research was carried out across 16 months between March 2007 and June 2009. It was divided into three phases: i) pilot study (March-June 2007); ii) data collection phase one (February-May 2008); and iii) data collection phase two (November 2008-June 2009) with time in between for analysis and interpretation. Preliminary data were also collected during the pilot study. Some information from this period is included in the thesis. A combination of qualitative and quantitative methods were employed to incorporate local views alongside observations and surveys. By using a variety of techniques a broad spectrum of informants from different age groups and backgrounds could participate [Denscombe 2008]. Men, women and children ranging from 5-76 years of age took part. Methods were tailored to access the opinions of a range of people from different sectors of the community. Participant observation, dietary assessments, workshops and informal or semi-structured interviews were carried out to explore how local people perceive and establish relationships with other animals. Discrepancies among individuals' literacy skills, interests, concentration spans and their roles in the community meant that certain methods were better suited to some participants than others. Gender also played an important role in deciding which activities were carried out with whom.

Participant observation enabled me to access the viewpoints of my subjects whilst improving my general understanding of the local culture [Collings 2009]. I accompanied men into the forest on hunting trips, during tourist expeditions and when they were working on conservation or research projects. I also observed them carrying out daily tasks such as carving canoes, and making drums and other wooden artifacts. When it was convenient for them, some men who held principal jobs at the Tourist Centre were shadowed at work. By comparison, food preparation is a female dominated role in the Tikuna household and so this was chosen as an appropriate topic to observe with women. I studied women preparing

and serving different types of foods in the home, they took part in quantitative dietary assessments and group cooking events (organised specifically for the study) [**section 2.4.7**] and informal drop-ins were made to a number of homes every week. I visited thirty-two homes in total. Each visit lasted an average of 16 minutes. In addition I spent four months living in the homes of three host families in both communities during the pilot study and in phase one of the fieldwork. This provided an opportunity to observe community life, learn about people's livelihoods and see how wildlife was used in the home. Whilst observing people in the community I participated in group activities so that I could experience and learn about local practices whilst I collected data. This technique provided a space for conversations to take place in a relaxed non-formal environment. Likewise, when local people asked if they could "be the researcher" and assist with data collection for the study I showed them how to take photographs and use the video camera. This led to formally arranged Participatory Film-Making (PFM) workshops taking place [**section 2.4.8**]. I also had several discussions with people about how to improve my research methods. A group of local people were involved in the final design of the study and advised me on a number of logistical decisions such as whether to carry out workshops or accompany user groups.

As well as gender and literacy the participant's age also dictated which methods were used. Most elders (which I define as adults over the age of 59 years) in Mocagua and San Martín are illiterate so oral methods were better suited to them than written exercises. Children (5-15 years of age) focused more easily in the classroom than outside as there were fewer distractions. Research activities were planned with teachers each semester to fit into set lesson times and incorporated into the timetable of each year group. In this way children of similar ages worked together to complete the exercises for the study. Time was spent talking to teachers and parents at school and conversing with visitors and staff at the ANP tourist lodge. Data were also collected opportunistically during daily interactions with people. Observing locals and chatting casually with them in their natural surroundings meant I became acclimatised to the local setting and built rapport with informants. In some cases informal interviews acted as a catalyst for relaxed discussions where people deliberated their social, cultural and economic circumstances. This provided a valuable context from which to analyse data sets.

An additional objective of the study is to address miscommunication between the indigenous communities in ANP and non-locals involved in the running of the Park, by providing insightful information about local people's perspectives of wildlife. For this reason, methods were designed to be participatory in their application. Participatory methods provide mechanisms which enable people to express their opinions regarding political, economic, management or other social decisions. Chambers and Reason [2008] suggest participatory methods break down the dichotomy between the "*researcher and the researched*" and encourage people to cooperate genuinely in research. However, for well-informed participation to occur transparency and mutual respect is necessary. It has also been argued that those most affected by a decision should have the most say while those least affected should have the least say [Cornwall and Jewkes 1995]. Participatory research covers a wealth of approaches and offers strategies for generating both qualitative and quantitative information. Glaser [1965] suggests another advantage of using participatory qualitative methods when carrying out in-situ research of this kind is that they can be fashioned to cater to local needs and avoid potentially controversial issues. It became apparent during the study that both qualitative and quantitative methods provide valuable comparative data of their own, and that by combining both methods the quality of information acquired was improved. Indeed, Becker and Geer [1957] advocate the use of participant observation in conjunction with direct interviews to overcome methodological limitations while Calder [1977] believes a combined multi-methods approach strengthens quantitative research through the triangulation of data.

All research was carried out abiding by anthropological protocols and ethical guidelines proposed by the Association of Social Anthropologists in the United Kingdom and Commonwealth (ASA) for Good Research Practice [March 1999]. Further details of the methods used in this study are provided in the following pages. A summary of methods is presented in **Table 2.1**.

Table 2.1 Summary of methods used to explore human-animal interactions with participants from the communities of Mocagua and San Martín in the Colombian Amazon

	Quantitative methods	Qualitative methods
Children (5-15 years)	- Categorisation lists about the local use and value of wildlife in the form of 'News Reports'.	- Documenting events, practices and community life through Participatory Film-Making (PFM) planning, presentations and discussions. - Dramatisations, games, music sessions and class discussions based upon Tikuna folktales. - One-to-one and group conversations about animals in the home and forest. Participant observation and all-occurrence sampling of human-animal interactions in the forest and community.
Women (16-59 years)	- Workshops to write species lists about the local use and categorisation of wildlife. - Dietary logs of foods consumed in the home. - Monthly register of meat and fish prepared in each household (weight in grams).	- Documenting events, practices and community life, through PFM planning, presentations and discussions. - Communal cooking sessions demonstrating food preparation techniques and the use of animal parts in traditional medicines. - Informal interviews with key informants during household visits, about the use and value of wildlife and domestic animals. - Semi-structured interviews with female heads of each household about the consumption of different foods. - One-to-one and group conversations about animals in the home and forest. - Participant observation and all-occurrence sampling of human-animal interactions in the forest and community.
Men (16-59 years)	- Workshops to write species lists about the local use and categorisation of wildlife.	- Documenting events, practices and community life through PFM planning, presentations and discussions. Forest excursions with specialised native hunters and local people working in tourism and research. - Informal interviews with key informants about the use and value of wildlife and domestic animals. - One-to-one and group conversations about animals in the home and forest. - Participant observation and all-occurrence sampling of human-animal interactions in the forest and community.
Elders (60+ years)	- Workshops to write species lists about the local use and categorisation of wildlife. - Composition of animal classification trees.	- Documenting Tikuna folktales during storytelling sessions. - Interviews about local beliefs and traditions planned and implemented by young people from Mocagua and San Martín. - One-to-one and group conversations about animals in the home and forest. - Participant observation and all-occurrence sampling of human-animal interactions in the forest and community.

2.2 Planning and permission

Permission was granted by the National Park Head Quarters in Bogotá Colombia to visit the indigenous communities of ANP in January 2006. Thanks to support from 'The Woolly Monkey Project' a two year research license was acquired from the Colombian National System of Natural Parks (Unidad Administrativa Especial del Sistema de Parques Nacionales Naturales, UAESPNN). Preliminary visits were made to Mocagua, San Martín, Palmeras and Macedonia to present a project proposal in May 2006. These four villages were chosen following advice from staff at the National Park Headquarters in Leticia. A spoken presentation was given in Spanish to comply with local convention and eliminate bias through illiteracy. This was translated into Tikuna by a local assistant for those people who did not speak Spanish. The objectives of the project were defined through discussions with local people and informed consent[16] was given by the communities for the work to go ahead in Mocagua and San Martín. Follow-up meetings were held in Mocagua and San Martín to discuss the aims of the project with the community in the presence of the *Curaca* and *Cabildo.* Family representatives attended, as well as teachers, Park staff, researchers and other people living and working in ANP. Participants were given the opportunity to ask questions or speak on a one-to-one basis with either myself or the *Curaca* if preferred. A broad scope of ideas and opinions were shared during the meeting. People discussed the success of current and past projects, conservation initiatives and other developments in ANP. The research proposal was further adapted to incorporate many of the suggestions put forward by local people. These included the researcher living in the community and providing opportunities for people to learn research techniques during the study. A timetable was planned with the communities and Park staff so that it did not interfere with their other commitments and facilitated the involvement of those wanting to take part. To complete the process, four copies of the official letter of request and information sheet (setting out the planned work) were made. One copy was given to each of the two *Curacas* in Mocagua and San Martín, one copy was held in the research centre and the final copy was sent to the National Park Headquarters in Leticia. These were

[16] Informed consent is; "*Consent which is knowledgeable, exercised in a situation of voluntary choice, made by individuals who are competent or able to choose freely*". It applies only when; "*All individuals have a right to be treated as persons rather than objects, and to have their autonomy and dignity respected*" [Freedman 1975].

written in Spanish but English translations are given in **Appendix I.** Each *Curaca* signed a copy of the letter granting permission for the research to take place, and a pilot study was carried out from March to June 2007 to further refine the research methods and ensure local specifications were met [Teijlingen and Hundley 2001].

During the pilot study I stayed with host families in Mocagua and San Martín for four months which allowed time for me to get to know people and talk to them about the research. I continued to live with host families during phase one of the data collection period for a further four and a half months as this was a good way of observing the everyday activities of people and recording the local diet. My time was divided between Mocagua, San Martín, and the research centre. Each month I initially spent 5-6 nights per week in one community and 1-2 nights per week at the research centre in order to use the generator to charge my laptop and store data. During phase two a family in Mocagua offered me a small house to stay in which they had built next to their family home for their son who was away at college. This meant I could remain in permanent contact with people in the community and be more involved in community activities. I used a canoe to travel to the research centre when I needed to charge my equipment and travelled back to Mocagua before nightfall. During this period I decided to split my time between Mocagua and San Martín into shorter intervals spending a fortnight at a time in each community. This was to ensure I did not become too estranged from either one. When staying in San Martín I provided gasoline to charge my equipment on the community generator as there was no option of reaching the research centre by canoe during these periods.

The first few days in each community were spent carrying out a series of walks around the village with key informants. It is suggested that community mapping of this kind is fundamental to help orient the researcher to their new surroundings [Briggs 1986]. Indeed, this was a helpful exercise to begin to understand the local territory and sites of key interest. Global Positioning System (GPS) navigation satellite equipment was used to map the locations of Mocagua and San Martín [**Fig. 1.2**]. Monthly meetings were held to review the objectives, outcomes and implications of the study. During these gatherings local people were asked to put their names forward as host families or to be involved in other aspects of the

research. It was also made clear that participants were free to withdraw from the research at any stage without explanation. Other researchers were encouraged to attend the meetings to avoid overlap and repetition of our work. Public meetings were attended by large audiences initially, but with time the numbers gradually decreased until only a committed core group of individuals continued to contribute regularly.

2.3 Promoting all-inclusive participation

Acquiring accurate information that provides a truthful representation of local perspectives presents a number of hurdles. These include social inequalities associated with gender and age. It was essential to adopt inclusive methods that minimised bias where possible in order to compare variation in opinions across generations and between men and women. This required careful planning and sensitivity prior to research going ahead. Some early ethnographies have shown that social hierarchies limit the participation of females, the young and the elderly whilst the views of 'high-ranking' males dominate [Connelly *et al.* 1996]. Indeed, Smith's [1990] publication suggested that 'women's work' in the home was made "invisible" through anthropological studies, whilst Edwin and Shirley Ardener [1975] talked about women as being a 'muted group in society' under represented in mixed-sex groups. They wrote; "*The softened sounds of the female voice were overpowered by strong male tones*" and "*Women are less listened to and less likely to be credited for the things they say*". By comparison all female discussions encourage women to speak openly as they are more likely to be listened to which affords increased opportunities for them to describe their experiences in full [Daniels 1987]. Likewise, in most societies children below a certain age are unable to contribute in full when interacting with their peers however, when associating with children of the same age they are more creative and expressive [Wenner 2009]. Ignoring these limitations during research leads to people's opinions being ignored and local realities being oversimplified [Umbarilla 2003].

The significance of women in Mocagua and San Martín as role models and decision-makers over resource use was apparent during the study. Recording their practices and chores in and around the home was therefore central to the study, as was the involvement of children and young people as future stewards of biocultural diversity. Research activities were carried out with children and adults separately, and with all female groups, to enable individuals to participate to their full capacity. Women's activities took place between 3-5pm. This was chosen by the women as a time when most men were hunting, fishing or at work. Children's activities took place at school between 9am-1pm in keeping with the school timetable. A meeting was held to explain the research activities and seek parental consent for children to participate.

2.3.1 Workshops

A total of 228 people from Mocagua and San Martín took part in the study, which represented 23% of the total population from both communities [see demographic tables for each community in **Appendix II**]. Participants were: children 5-15 years of age, males 16-59 years old, females 16-59 years old and elders 60+ years of age [**Table 2.2**]. The oldest participant was 76 years old.

Table 2.2 Population demographics of participants from Mocagua (n=511) and San Martín (n=480) in ANP, Colombian Amazon

		Mocagua		San Martín	
Age (years)		n	% of population*	n	% of population
Children	(5-15)	77	15.1	60	12.5
Males	(16-59)	12	2.3	11	2.3
Females	(16-59)	17	3.3	23	4.8
Elders	(60+)	11	2.2	17	3.5
Total no. of participants		117	22.9	111	23.1

*Data from Reyes [2008]

Informants showed different levels of commitment to the study through the amount of time they spent participating in research activities. Some took part only once, whilst others attended meetings and were actively engaged throughout the 16-month period. A general increase in group size was observed during workshops with adults across the initial three months, but over time numbers became more consistent with an average group size of 16 people (n=63 adult participants). These fluctuations suggest a growing interest in the project to begin with which later leveled out. Most people in the community attended at least one workshop as they were curious to learn about the research. Those who continued to participate either did so because they had a genuine interest in the work, enjoyed the group activities and learning new skills or simply wanted to oversee the research activities. These details are significant to the interpretation of the results as they provide information about the diversity of participants who contributed to the data sets.

2.4 Overview of research methods

2.4.1 Participant observation

A total of 246 days were spent collecting data through participant observation averaging 20 days per month (n=16 months). This period spanned the late wet and early dry season allowing for seasonal comparisons. Just over 200 days were spent living with six different host families ($\bar{x}$ =33 days per family) assisting in chores and participating in community activities. In addition I spent 170 mornings with school children and 40 days in the forest with hunters, local tour guides and indigenous research assistants.

2.4.2 Forest excursions

Being female I naturally associated with women more than men in the communities. Whereas women were at home most days men either went hunting and fishing or spent the day working at the tourist lodge. Opportunities to participate in male dominated activities therefore arose less frequently. To compensate I scheduled trips with groups of men, including excursions with hunters and walks in the forest with local tour guides. These events provided opportunities to observe human-wildlife interactions in the forest and to hold discussions and semi-structured interviews with men on topics that did not otherwise come up during time spent in the community. When walking in the forest for example, hunters spoke about how they tracked wild animals and explained some of the intricacies of hunter-prey relationships. They also pointed out sacred sites and told stories round the fire at night. I took brief notes and recorded the tales using a digital voice recorder. These were elaborated on through drawings or re-enactments when requested. A number of anecdotes and folktales were documented in this way. I filled 1,348 pages of notebook and recorded 176 minutes of narrative. These data were later converted to electronic format for sorting and analysis.

2.4.3 Species categorisation lists

In phase one of data collection (February-May 2008) the recognition of wild animal species was evaluated among people from Mocagua and San Martín during two workshops in each community, facilitated by myself and a local assistant. The meeting house was chosen as a suitable space to hold the workshops. Everyone

was invited to take part through announcements made during public meetings held in the meeting house previously and by placing posters around both communities. The community bells rang on the day to remind people that the workshop was about to begin. During the workshop people were free to come and go as they wished. I made a note of who was present and who took place in the written activities to keep an accurate record of participant numbers. Informants were either separated out into separate groups or worked together depending on the number of people present. Group size did not exceed 20 individuals to ensure the full participation of those who took part.

Each group was given a pen and a piece of A2 paper with the headings: food, pets, medicine, arts and crafts, tourism and folklore, written along the top. Participants were asked to write down the names of as many mammalian, avian, amphibian, reptilian and fish taxa that they could think of for each column according to their uses and how they categorised them. To eradicate discrimination through illiteracy photographs were used as visual aids to verify the identity of animals. I also asked that at least one person in each group made a note of what was being discussed. People were left to work on this activity until they tired of it or could think of no more animals. When they had finished their lists each group was asked to expand on the reasons why they had attributed species to different categories. The main points were summarised for further exploration and these data were referred to during the group discussions and semi-structured interviews that followed [Morgan and Spanish 1984]. Tikuna animal names were translated into Spanish with the assistance of a local translator and by referring to '*The Emmons Field guide for Forest Mammals of South America*' [Emmons 1999] to obtain scientific names and enable later analysis.

Although each group covered similar material, because of the nature of the activity, absolute replication of methods was neither possible nor necessary. Methods were adapted so that individuals with different abilities could participate according to their needs. A brief description of the project and the format of the activity were explained to adults and older participants. They discussed the value and use of each species in turn and made decisions based upon argument and persuasion. For children this activity was presented as a piece of group work based upon the Biblical Story of Noah's Ark. Noah's Ark was suggested as a

theme by the teachers as both schools had a book of Bible Stories which were well known by the children. This suggestion showed the degree of influence that the Catholic Church has in the communities of Mocagua and San Martín and the effects this has on people's ideas about nature. Children were given the imaginary scenario that their village had flooded and they were left with the task of deciding which animals they wanted to rescue and which ones they would leave behind. Information about the impact of climate change on water levels in the Amazon was also introduced during this activity. Children recorded their answers and made 'Community News Reports' [17] in groups of 5-6 individuals, using the video camera. These were later shared between different year groups and shown to teachers and parents. Further details of children's activities are provided in **section 2.4.6**.

2.4.4 Animal classification tree

Preliminary observations during categorisation tasks for species use [**section 2.4.3**] indicated that elders in Mocagua and San Martín had a distinct understanding of the forest environment which varied from the way other age groups talked about nature. To further explore these differences the ways that older participants categorised animals were explored. A meeting was held with a group of six participants spanning the ages of 60-76 years. They were invited to expand on the comments that were recorded during workshops. These covered subjects such as shape-shifting, inter-species communication and spiritual guardians of the forest (*dueños*). Participants began by mapping out a classification tree which demonstrated how different species [18] are associated. Animal names were written in Tikuna by the elders and then translated into Spanish where possible. This was done with the assistance of a young person from the village who acted as scribe and translator. Two sides of an A1 sheet were filled. The exercise lasted several hours and involved numerous debates and discussions. I later interpreted the information into a diagram for analysis [**Chapter 5**, **section 5.4.2**].

[17] The children were familiar with News Reports as the community frequently watch them on the television.

[18] This included animal species alongside 'animal-persons', spirits and 'mythical' creatures [explained in **Chapter 5**].

The classification of animals and plants into species-like groups in this way, is called ‘folk taxonomy’. The relationship between folk taxonomy and scientific biological classification can help explain how people from different cultures categorise and value wildlife in different ways. The species lists generated through the tasks completed in phase one of the study were used to guide group activities during phase two (November 2008-June 2009). During phase two of data collection people were asked to identify the most and least important species from the lists they had previously written in phase one of the study. This was to assess whether multivariate analysis was a suitable method to use on these data. This type of analysis makes the assumption that during free-listing the order with which things are listed is representative of their relative importance to the people writing the lists, i.e. those things written down first are most highly valued [Feinstein 1996]. Participants from Mocagua and San Martín selected a number of different species as being important for various reasons, some of which had been written in the middle and towards the end of their lists. It was therefore determined that these data were not suitable to be tested using this technique. The activity also sparked conversation between participants about how and why wildlife is important in their communities. These data are woven into the results and discussion chapters of the thesis.

2.4.5 Informal interviews

One hundred and sixty-seven informal interviews, to discuss the use of wildlife and people’s relationship with nature, were carried out with individuals and small groups of fewer than ten people. Apart from the few interviews that took place with staff at the tourist lodge, which had to be planned in agreement with ANP management, the majority occurred opportunistically. Conversations typically lasted between 15 and 65 minutes with an average length of 21.8 minutes and a modal range of 18-20 minutes. The majority were carried out in informal settings to encourage participants to talk openly [Collings 2009] but people’s availability ultimately determined their willingness to talk. When requested these conversations took place in privacy to ensure confidentiality and freedom from disruption. Direct questions were avoided, replaced by phased assertion, which is said to build trust and show cultural competency [Kirk and Miller 1988; Agar 1980]. Consequently most discussions took the form of casual conversations, sometimes

steered by the researcher to cover specific areas of interest and other times guided by the participant generating new leads of enquiry.

The topics discussed during informant-led interviews included hunting, fishing, food taboos, local beliefs and folkbiology, social activities and the local economic situation. I was keen to acquire people's perspectives about conservation and tourism in ANP as these data were only partly covered through other methods. The "snow-ball technique" was used to identify interviewees following suggestions from other participants [Kaboolian and Gamson 1983]. A range of informants was spoken to and a broad spectrum of perspectives acquired. Seventy-five percent were adults, 15% elderly, 6% non-indigenous people who worked in the region and just 5% were children [**Table 2.3**]. The few interviews that were carried out with children occurred spontaneously during lesson time or walking to and from school. The majority of participants interviewed were adult men and women between the ages of 16-59 years. People do not often live beyond 60 years of age in Mocagua and San Martín due to insufficient healthcare and nutrition, which provides one explanation as to why participants above the age of 60 were less common. Only ten interviews took place with non-locals as few people, other than the region's indigenous inhabitants, had any long-term experience of living in the area so their knowledge was limited. Researchers, NGO workers and other people involved in conservation or development work provided most of this data.

Table 2.3 The frequency of informal interviews carried out with different aged participants from Mocagua and San Martín in ANP, Colombian Amazon (March 2007-June 2009)

Participants	Mocagua		San Martín		Total
	No. of participants	% of community	No. of participants	% of community	No. of participants
Children	8	10	0	0	8
Males	27	18	38	26	65
Females	38	34	21	18	59
Elders	9	43	16	70	25
Total no. of locals	82	16	75	16	157
Non-locals	0	0	0	0	10
			Total no. of interviewees		167

Most interviews and group discussions were implemented near the end of the research, apart from an initial conversation with a group of hunters which contributed toward the planning and design of the study. Data from interviews appear in the text as "*[...participant name (where permitted), age, community...]*". These were formally planned with informants beforehand. A general description of the interview was first explained to the participant and they were then asked to choose a specific area of interest relevant to the topic. Respondents were left to talk uninterrupted, only prompted if they deviated excessively from the subject or requested confirmation or guidance. I composed written notes throughout and used a handheld voice recorder when given permission. On occasion, a family member or friend filmed the interview. However this took place only if the interviewee was at ease when being filmed. Ensuring the cameraperson was someone the interviewee knew helped with this. The most frequent topics of conversation discussed by participants were: Tikuna culture and identity, traditional folklore, pet-keeping, children's relationship with the forest, ecotourism, hunting and the importance of meat in the diet. Interview data were transcribed and sorted into categories corresponding to attributes identified during animal classification activities. Further details of data analysis are given in **section 2.6**.

2.4.6 Children's activities

I attended school Monday to Friday from 9am-1pm to observe lessons and carry out supplementary activity sessions. The methods I used varied depending on the age of the children. They were designed to be fun, educational and accessible to young people with assorted levels of competence. Creative activities were used alongside reading and writing. These included art, music, drama, games and film-making. As a safety measure parents requested that all children's activities took place in the school. This meant that those children who did not attend school were unable to take part. Child participants were aged between 5-15 years[19] with mean and modal ages of 10 and 8 years respectively in Mocagua, and 7 years for both in San Martín. Seventy-seven students participated in Mocagua, which accounted for 34% of 5-15 year olds in the community, and 60 children participated in San Martín, representing 25% of 5-15 year olds [**Fig. 2.1**].

[19] In this study children are defined as any person below the age of 16 years. According to community norms most young people over 15 are treated like adults and expected to carry out adult responsibilities.

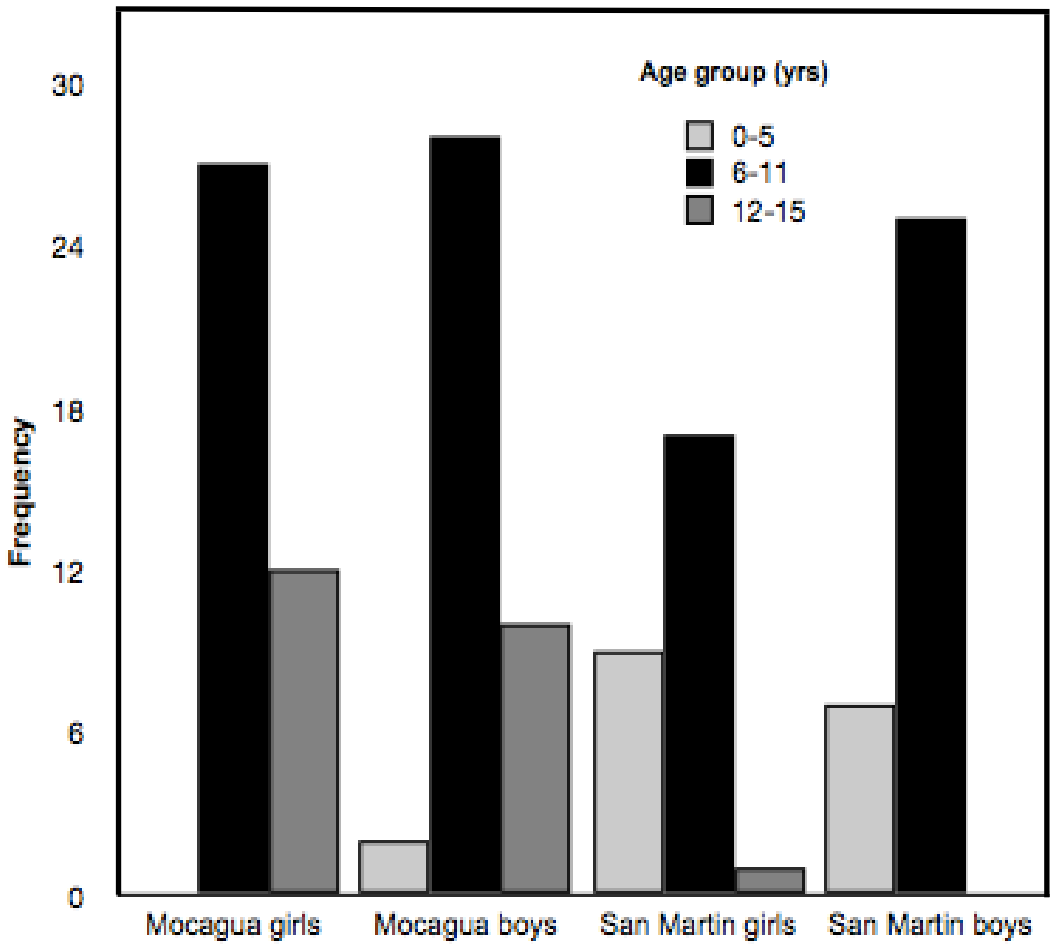

Figure 2.1 Age of child participants from Mocagua and San Martín in ANP, Colombian Amazon (March 2007-June 2009)

School lessons are taught to children of roughly similar ages in four class groups: preschool (3-4 years), grades 1 and 2 (5-7 years), grades 3 and 4 (8-10 years) and grade 5 (11-15 years). Class composition also depends on the number of children who attend school each day, and their academic abilities. Research activities were carried out once a week with each class. It was decided by teachers and parents that preschool children would not take part in the research as it was too complicated for them. When children less than 5 years old accompanied their older siblings, and mothers during women's activities, they were given games and colouring sheets to occupy them. There were no teachers at school in Mocagua on four occasions due to sickness, and so children of mixed age groups and various abilities worked together in the same class.

2.4.6.1 Dramatisations and storytelling

At the time of the study a textbook designed specifically to teach indigenous children about Tikuna folklore was distributed to primary schools across the Amazon by a local NGO. In keeping with this book it was decided that elders from the village would be invited into the schools once a week to recite folkstories to each class. They were asked to recount two or three stories per session to each year group. Three elders came to the school for a total of ten days in Mocagua and two elders made seven visits to San Martín's school across one and a half months. Each story lasted between 20-80 minutes with an average time of 34 minutes per story in Mocagua (n=17) and 12.5 minutes per story in San Martín (n=42). Following each session children were arranged into groups of 4-7 individuals to draw storyboards and plan a theatrical performance to show to the class based upon their favourite story they had heard that day. Props and percussion instruments were made using recycled materials found around the community and I provided face-paints. A number of the performances were filmed using a video recorder. This activity proved a novel and effective way of accessing children's perceptions about Tikuna folklore as well as watching their interpretations of different animals. Furthermore it encouraged oral methods of traditional education and provided me with an opportunity to hear and document traditional Tikuna folkstories.

2.4.6.2 Categorisation lists and news reports

Students were grouped with seven or eight classmates of a similar age to explore the use and importance of animals in the home and community. This group size was favoured as being adequate to promote productive discussions without being too large to impede individual participation. Children of the same sex chose to work together which allowed for gender comparisons to be made [Torgler *et al.* 2003]. Each group was given a sheet of A2 paper divided into six columns with the headings: food, pets, medicine, arts and crafts, tourism and folklore, alongside its lexicon symbol to assist non-readers. Each group was asked to list as many animals as they could under each heading, either by writing the names of animals or drawing pictures in the corresponding columns. Picture cards and illustrated books were used to assist with species identification. The children were then asked to make a short film in the style of a local 'News Report' talking about a huge flood coming to ANP. They were asked to say which animals they would

save, which species' they would leave behind and then explain their decisions. A number of children had developed the basic skills needed to operate the video camera and direct during a Participatory Film-Making (PFM) workshop which I had facilitated in the weeks prior to this activity. Details of these workshops are given in **section 2.4.8**. The children's News Reports were shown to teachers and students on the school's television and followed by discussions and feedback from community members.

2.4.7 Women's activities

As mentioned previously [**section 2.3**] early published anthropological work suggests the experiences of females are often distorted through the male oriented language adopted in routine research procedures [De Vault 1990], and therefore creative methods should be carried out based upon female focused tasks [Smith 1990; 1987]. The activities in this study were chosen by women from the communities during the pilot study based upon practices they identified as being important to them. Women between the ages of 17 and 70 kept written records of their families' daily meal compositions in Mocagua (n=17) and San Martín (n=23) between March 2007 and February 2009. During this time some women weighed the amount of meat and fish in their diets whilst others took part in communal cooking activities. I also participated and helped prepare the food where I could. Male participants were given the task of helping to film the cooking sessions. Women who were competent with the video camera (following PFM workshops detailed in **section 2.4.8**) also assisted. Despite concerns over mixed-sexed assemblages men constituted 19% of participants for this activity (with an average age of 35 years). They were welcomed by the women and did not noticeably change the group's dynamics. Participant demographics are provided in **Table 2.5**.

These activities were female-led only enlisting assistance from men in the community when required. Men remained attentive and respectful towards their female counterparts throughout the cooking sessions and appeared keen to learn from them. In Mocagua two of the women's husbands helped extract palm heart and cut *asaí*[20]. In San Martín men and women worked together to harvest

[20] *Asai* seeds grow in heavy clusters at the tops of tall palm trees that are notoriously difficult to climb. There are several methods for scaling the *asai* palm all of which require good upper body strength. Men therefore usually climb the tree binding their feet with a chord and cutting the seeds with a machete.

'*mojojoy*' enlisting the help of younger men to cut the *canunguchu* palms[21]. Some men also assisted in the preparation of the *mojojoy* for the meal that followed. For this reason there is a noticeable age difference between the male participants from Mocagua and San Martín [**Table 2.4**]. Five young men from San Martín and two older men from Mocagua also attended the cooking sessions as they wanted to learn how to prepare traditional dishes. One man told the group; "*I want to be in the cooking group to learn how to make the dishes my mother used to cook when I was a child*" [Male, 43 years of age, May 2007].

Table 2.4 Participant demographics for women's activities in Mocagua and San Martín, ANP Colombian Amazon (March 2007-Feb 2009)

Participants	Mocagua			San Martín		
	No. of participants	Avg. age (yrs)	Modal age (yrs)	No. of participants	Avg. age (yrs)	Modal age (yrs)
Females	17	40	40	23	36	21
Males	2	48	48	5	18	20
Overall	19	44	44	28	27	21

2.4.7.1 Dietary logs and monthly food registers

At the beginning of the study one-to-one semi-structured interviews were carried out with the female heads from each of the participating households. This accounted for 28% and 48% of families in Mocagua and San Martín, respectively. Women were asked to recall the foods they prepared for their families each day. They shared this information with me during communal cooking sessions so that I had a chance to clarify any data that were unclear. The main sources of protein were identified from the data recorded for 822 meals and comparisons made between the types of meat eaten in each meal, as well as those meals without meat. From this process I determined that food choice revealed vital information about people's perceptions of animals and decided that systematically comparing the consumption of bushmeat and wild caught fish with domestic meat, and tinned or frozen sources of protein would form an integral part of the study. These methods were further developed following group analysis with the women. As a result of our discussion a log sheet was produced for the women to record the

[21]The *mojojoy* grub is a larvae found in the *canunguchu* palm. Unless the location of previously cultivated *mojojoy* is known a large group of people will travel into the forest and cut deep into the trunk of several trees to search for the grub.

meals they cooked each day [**Appendix III**]. The main protein eaten in each meal was recorded as one data point for the purpose of analysis. Some new members joined the cooking group in phase one along with the majority of the women who had contributed during the pilot study.

During the second research period (November 2008-June 2009) women suggested weighing the amount of meat and fish their families ate each day. It was agreed this information would be valuable to the study and so forty households were given a set of weighing scales and some data sheets to complete. The women were shown how to use the equipment to record accurate readings. Despite their initial enthusiasm however the scales over complicated the data collection process for some, and they found that for each of them to weigh the food they had before preparing it was time consuming. Instead, they scheduled a rota so they could share out the responsibility of food-weighing between the group. Three to four women were allocated the role one month at a time. This gave every participant a six to nine month interim period where the task was carried out by women from different households. A group coordinator was elected to collect the completed data sheets. It was also this person's task, with support from the group, to produce a list of ingredients for each of the communal cooking sessions and assign specific duties to other members of the group.

2.4.7.2 Communal cooking activities

The women's communal cooking sessions took place two to three times a week in each community, either at the *maloca*[22] or school in San Martín, and at the nursery or in one of the women's homes in Mocagua. One of the main objectives of this activity was to recuperate some of the culturally important foods that were once commonly consumed by the Tikuna. The meals they chose to cook were therefore mostly traditional Tikuna dishes. Depending upon what resources were available on the day it was not always possible to prepare the planned recipe. Women went fishing, brought meat that their husbands or sons had hunted and contributed local ingredients from the *chagra*. I bought oil, salt, rice and sugar in Leticia using a portion of my research funds. Before they started cooking their dishes detailed discussions took place between the women about how to best prepare the food and to clarify each person's role. A copy of the sheet used to plan these sessions

[22]San Martín's *maloca* is a traditional roundhouse that was constructed in 2006 with financial support from ANP to attract tourists and to be used for communal events.

is provided in **Appendix IV**. Information collected through participant led group discussions and semi-structured interviews were used to elaborate on observed and quantitative data. When other related topics such as the cultural, social and medicinal significance of foods and food sharing came up in conversation I made a note of what was said. Over the course of the study 11 recipes were cooked in Mocagua and 12 in San Martín. Evenings were spent showing what had been filmed to the rest of the community and receiving their comments and feedback. Hunting is traditionally a male-dominated activity therefore women naturally spend less elongated periods in the forest, they do however frequently go for walks to gather seeds and forest fruits. A number of women also spoke about times when they had accompanied male hunting parties as young cooks. Indeed, these research activities proved that women also have extensive knowledge of the forest and wild animals largely acquired through time spent collecting resources, making traditional medicines and preparing food. Many older women demonstrated specialised knowledge about the ecology, behaviour and hunting of wild plants and animals and the properties and preparation of these species for medicines and rituals.

2.4.8 Participatory Film-Making (PFM)

Participatory Film-Making (PFM) was trialled as a research method during phase one of the study to overcome some of the barriers that impinge upon researcher-informant communication. Where indigenous practices and perceptions are documented and edited by others the outcome is typically the reporter's interpretation of what he or she has seen which can cause cross-cultural misapprehensions. In PFM however, participants plan their own documentaries. They are the subjects of their films, working together to record and edit footage, until they are satisfied with the end product. I facilitated a series of workshops in Mocagua and San Martín to teach people basic filming techniques. Participants learnt how to use the different functions of the video camera and create special effects, plan a short film and produce a storyboard, conduct and record interviews and carry out simple film and audio editing. Learning these skills meant people shared experiential life events, whilst showing the films to others provided an opportunity for individuals and groups to exchange stories and have their opinions heard [Lunch and Lunch 2006]. The method proved effective and popular with participants and so was continued on into phase two.

2.4.8.1 The PFM methodology

I spent a significant amount of time developing PFM into a research method for the study, exploring different techniques with local people from Mocagua and San Martín from February 2008-June 2009. Most participants had no previous experience of photography or film-making and were enthusiastic to use the camera. Some older people were cautious to begin with and chose not to take part until later on in the study. Workshops took place in each community for a two-week period, either in the local meetinghouse, the school or outside, depending on availability and group preference. These sessions were organised according to the participants' age and gender, adhering to local norms, with similar aged, same-sexed people working together where appropriate. Some older members of the community benefitted from support by younger friends or relatives and so chose to take part in young people's workshops. Following discussions with parents and teachers it was decided that children under the age of nine years would not use the video camera as it was feared they would damage it. Young children and babies who accompanied their mothers and older siblings however, featured in the films. Following their requests participants were awarded certificates once they had completed the course [**Appendix V**].

2.4.8.2 PFM workshops

The facilitation process is critical to the outcome of PFM being a participatory method as this is what dictates whether the activity is led by the researcher/ facilitator or the subjects/participants. To enable the film projects to be participant led people must feel confident handling the video camera on their own and methods should be tailored to suit the needs of the group to ensure all-inclusive participation [Lunch and Lunch 2006]. During each workshop I gave the group the camera to look at, handle and explore while I stepped back and observed from a distance. Participants were asked to assist those less able than themselves. The camera's functions were explained using enlarged visual diagrams, which people could refer to when necessary. A step-by-step account of the methods used is given below.[23]

[23] The researcher is referred to as 'facilitator' to emphasise the supportive 'backseat' role adopted during PFM workshops.

Step one: The participants and facilitator sat in a circle with the video camera (Sony Digital Mini DV) placed in the centre whilst still in the bag. A volunteer removed the camera from the bag and handed it to the person next to them. The camera was passed around the circle so that each person became accustomed with its weight and form. The facilitator took part but was sure not to reach for the camera or interrupt the process until it was their turn.

Step two: The video camera's functions were explained to the group using enlarged visual diagrams which were laid out in the middle of the circle. The facilitator pointed them out on the camera which was again passed around the circle, so that each person could have a closer look.

Step three: Each participant took it in turn to show the person sitting next to them how to hold the camera steady using the hand strap, how to remove and replace the lens cap and how to open and close the side screen.

Step four: Step three was repeated, this time switching the camera on and off and looking at the person opposite through the lens and side screen.

Step five: Participants were shown the 'zoom' button and the camera was passed around again, this time practicing to focus and 'zoom-in' towards a distant object. This process sometimes involved asking a volunteer to step outside of the circle to be the 'distant object'. During steps 2-5 the importance of not touching the lens (referring to it as the camera's 'eye'), replacing the lens cap, closing the side screen and switching the camera off when not in use to preserve battery power was explained.

Step six: A variation of "The Name Game" [Lunch and Lunch 2006] was explained to the group. Participants worked in pairs to film each other saying their name, age, clan and one additional fact about themselves or their community. Examples were provided using prompt cards when requested. These included: "*My favourite food is...*"; "*The best thing about my community is...*"; "*If I could change one thing about my community it would be...*" Each recording lasted no longer than 30 seconds. Once everyone had completed the task, footage was played back and shown to the group using the flip out side screen on the camera.

Step seven: The tripod was stood in the centre of the circle and its function explained to the group. Two people were then asked to collapse the tripod and pack it away in the bag. A second pair were chosen to take the tripod out of the

bag, extend it to its full capacity and place the camera on top. This was repeated several times until everyone who wanted to had a chance to participate. Younger participants were either assisted by the facilitator or by older children.

Step eight: Next the group were asked to choose a location in the community to film. The equipment was set up by two participants and “The Disappearing Game” [Lunch and Lunch 2006] was explained to the group. This activity allowed participants to practice using the ‘record/pause’ button and create special effects. One person was in charge of the camera while the rest of the group stood in shot. The record button was pressed and left running for three seconds then paused. At this point one person from the group stepped out of shot and operated the camera. This was repeated until there was no one left in shot and everyone had pressed record and pause once. Footage was played back to the group using the flip-out side screen and then watched as each person seemingly “disappeared” from shot.

During this method I noticed that participants explored the camera’s functions with more ease when filming took place away from the formal workshop setting. It also attracted public interest from other community members, many of whom participated at a later date. When new people joined the group they were taught how to use the camera by more experienced participants. A refresher course was run in January 2009. Following this, a second camera was provided to cater for groups with mixed abilities. This helped ensure inclusion where men and women attended the same session and meant those who quickly grasped the basics of filming could start producing their own films while others continued to practice using its functions. The second camera was also used to demonstrate to more advanced practitioners how to record different shot types using lighting and different angles to create effects.

2.4.8.3 Community film projects

Participants who attended the PFM workshops worked in groups of 5-10 individuals to fulfill the brief of making a short film about their community or forest, no more than 15 minutes long. Each group gathered to discuss their ideas and dates were arranged to start filming. Film projects varied between groups. Men chose to film events and activities in the community including ceremonies, canoe-building, wood carving and work in tourism. Women filmed meal preparation, traditional food and medicinal practices. Young people interviewed older relatives

and filmed events in the community, whilst children made films showing their interpretations of folkstories they had heard at school. A total of 47 films were made in Mocagua and 30 in San Martín [**Table 2.5**]. I later transcribed the films so that key phrases and quotes could be incorporated into the thesis.

Table 2.5 Number of films made by Participatory Film-Making (PFM) in Mocagua and San Martín in ANP, Colombian Amazon (Feb 2008-June 2009)

	Mocagua	San Martín	Total
Women	15	14	29
Men	3	2	5
Young people	3	4	7
Children	9	4	13
Mixed-groups	17	6	23
Total	47	30	**77**

Women's filming projects

Women from Mocagua and San Martín shared concerns over a loss of traditional culinary skills in their communities through the introduction of processed and tinned foods and this formed the basis of their film projects. They recorded a series of short films documenting recipes to teach to the young and share with people from other communities. At the start of each session the women planned storyboards on A2 paper drawing out each stage. This helped clarify the subject of each scene and each person's role [Lunch and Lunch 2006]. One person was allocated the video camera and another was chosen to be Director. The Director was in charge of ensuring everyone was in place and prepared before filming began. A digital stills camera was also brought to the session so that someone could be the group's photographer and document the process. Others guided the cooking procedure, explaining each stage in detail while the rest of the group contributed by building the fire, chopping wood and preparing accompaniments to go with the main meal such as juice and rice. These tasks were alternated each week to ensure all those who wanted had a chance to use the video camera and direct. Further details of communal cooking sessions are given in **section 2.4.5.2**. A total of 28 recipes were filmed. The films were edited by the facilitator with the help of four young people from San Martín, with several of the women present to oversee the process. The number of people who took part in the cooking group

increased week by week, expanding from just seven during the first two weeks up to 28 people during the final months. Once each film had been edited and the women were happy with them they were shown to the rest of the community.

Film showings triggered conversations with the audience which were also of value and interest to the research. These involved discussions about the importance of certain animals as food and what has caused the local diet to change. I noted any points of particular relevance and later transcribed them into qualitative data records. Women documented the cultural significance of food for the Tikuna and information about their associated medicinal and healing properties. It became apparent during community viewings that much of this information was largely unknown by youngsters and so these data were compared and triangulated with species lists made during workshops in phase one of the study.

Men's filming projects

Unlike the large, diverse group who worked together on the women's film projects, men developed their ideas within smaller groups, working with close companions or relatives. They recorded traditional dances and ceremonies such as the *Pelazón* in San Martín, and documented their work around the community. Although some of these activities were not directly related to the research this was a good way for people to practice using the camera and provided opportunities for discussions and casual conversations to take place. Men made fewer documentaries than women did (n=17) and took longer to plan and film them. A few people made use of having filming equipment to develop their own personal projects such as advertisements for their local businesses. For example one man enlisted a small team to help him promote his 'ecotourism' home-stay. He made a short film to show to tourists and tell them about the traditional *maloca* he had built in the forest for tourists to visit. Together with help from a small group of young men from his community he filmed a 'typical day' at the *maloca* including a guided walk by his elderly mother Doña Josefina Cayateno. Doña Josefina talked about the plants and animals in the forest and explained their significance to the Tikuna. She cooked a traditional meal in the *maloca* over an open fire, and performed a song and dance about the *mojojoy* grub, both of which were also documented. The film was of particular interest to the communities and encouraged conversations with people who were otherwise uninterested in taking part in the research.

Young people's films

Young people in San Martín filmed interviews with village elders (n=9). The title of their film project was 'Tikuna tradition and folklore'. To ensure older interviewees felt comfortable they were asked to choose where they would like to be filmed and whether they wanted the discussion to take place in Spanish or Tikuna. The questions the young people asked depended on the specific interests of the person who led the interview. This role was rotated between the group. When the interview took place in Tikuna a young person translated into Spanish for me so that I could take note of what was being said. This meant that the participants had some control over what information was shared in the research. In Mocagua young people made films about sports and various ecotourism projects. Those participants who wanted to learn how to edit films also attended a three day course which I ran at the research centre in ANP. Six people between 17-25 years of age attended the course. Once the group were happy with their films they were shown to the elderly participants to ask their permission to present them to the rest of the community.

Filming with school children

Film projects were carried out with school children during lesson time. They were taught how to use the filming equipment in groups of 10 to 12 individuals. The training process described in steps 1-7 was adapted to the students' needs depending on their age and ability. Once individuals had grasped the basics, games were facilitated which helped the children further explore the camera's functions. This involved using a plastic blow up parrot as a prop and a banana as a microphone. The group sat on the floor in a circle with the video camera stood in the middle on a tripod. One child was chosen to operate the camera from the centre of the circle. They slowly rotated it 360º filming each of their classmates in turn who introduced themselves and recited their age and clan. This was repeated several times asking new questions related to food, pets, tourism, folklore, medicine and arts and crafts. Children also filmed role-plays and News Reports as described previously in **section 2.4.6.2**.

Participation by the elderly

Most older participants from Mocagua and San Martín preferred being filmed talking rather than operating the camera. Several elders were invited to the school to tell folkstories and were filmed and interviewed bychildren and young people. They conveyed ideas about the forest, their ancestors and shamanic practices. This proved an effective way of capturing information about their perceptions of human-animal interactions and so was later transcribed and analysed to be incorporated into the thesis.

2.4.8.4 Feedback and dissemination

An evening event was held at the end of the study for both communities to gather together and watch their films, organised by myself and local people who had completed the PFM workshop. Several discussions took place which provided me with an interesting insight into some of the differences between people's views and local practices in Mocagua and San Martín. The film viewings prompted the women to arrange a food sharing day in San Martín's community *maloca* where they exchanged recipes and tried each other's dishes. Copies of the documentaries were disseminated to both communities so that each one had a full set of the films that were made. Although costly and time consuming arranging community viewings and producing DVDs was an essential element of the PFM process as it provided people with evidence of their work and allowed time for feedback.

Towards the end of the study a video camera was left in each community a week at a time in the home of an elected 'local facilitator' who was to be the person in charge of looking after the equipment and lending it out to people who wanted to make films. This handed over full responsibility to the communities and provided an opportunity for participants to become researchers. Using PFM meant a combination of integrity and sensitivity was required when carrying out filming as a research method. Due to the sensitive nature of filming certain conditions were set to ensure confidentiality and correct ethical conduct [Umbarila 2003]. Agreements were signed by the *Curacas* which promised community ownership over the footage, and written permission was acquired for information from the films to be reproduced in this thesis and in any additional publications or presented at academic conferences. A full set of the films were stored in Mocagua, San Martín and the ANP research centre and their central office in Leticia.

2.5 Evaluation of methods

In the critique that follows I highlight both the positive and negative aspects of the methods used in this study. I explored social norms and rules of behaviour, what has meaning to local people and how individuals imagine and explain things. Kottak [2006] suggests that researchers are often too involved in what they are doing to interpret another's culture impartially. For this reason it was an objective of mine to find a way of understanding "how local people think", perceive and categorise nature and animals, with minimal bias from my own preconceptions. To do this it was necessary to assume an 'emic' approach that employed participatory methods and included local people in the design, planning and implementation of the project. By comparison 'etic' perspectives and associated method are typically scientist-oriented and shift the focus from local observations, categories, explanations and interpretations to those of the researcher. The emphasis is on what the enquirer considers important. Even when using participatory methods however, analysis of any kind requires some interpretation by the researcher which will be shaped by their cultural disposition. Rather than being a limitation I recognise this as adding richness to the data on cross-cultural comparisons.

2.5.1 Interviews

It has been proposed that interviewer–respondent interactions suffer significant problems where researchers find it difficult to communicate with the interviewee through linguistic or cultural incompetence [De Vault 1990; Briggs 1986; Michaels 1985]. Indeed, I found that the quality of information acquired through planned interviews was poor in comparison to the level of understanding gained through casual conversation and interactive group work. For this reason interviews were kept to a minimum. Furthermore, key informants were selected and asked to take part in one-to-one interviews only once a good relationship had been established. Michaels [1985] states, "*A lack of shared cultural norms for telling a story, making a point, giving an explanation and so forth can create barriers to understanding",* whilst Briggs [1986] suggests that interviewers can be: "*demanding or controlling"*, "*only interested in asking questions and recording answers*", "*abruptly changing topics*", "*interrupting the respondent*" and "*pursuing topics of interest rather than listening to the speake*r". While it may be true that interviews often reflect the researcher's perspectives more prominently than the views of the respondent

[Brook and McLachlan 2005] they are convenient when specific points need to be addressed according to the researcher's objectives. Furthermore, most people in Mocagua and San Martín over 60 years old are unable to read written Spanish so interviews and casual conversation were the most appropriate way of accessing information from them.

2.5.2 Workshops

Workshops were designed to enable all-inclusive participation and encourage people to work together and talk openly with each other. The objective of this was not to include everyone in the research, but to provide opportunities for those who wished to take part. However, because of social constraints some individuals were not permitted to engage in the research activities by the rest of the community (because of their age or ability), and I chose not interfere with these decisions. Group discussions took place at the end of each session to facilitate knowledge-sharing between informants. This provided an opportunity to hear the collective insight of the group as well as engaging individual opinions. Threlfall [1999] argues that group tasks of this nature are preferable over participant observation as the researcher is more easily able to steer the conversation towards topics relevant to their study. While group tasks were useful for acquiring certain types of data, workshop activities had a tendency to produce biased results that were channelled towards my own interests where I set the discussion topic, and so were accompanied by participant-led activities. Furthermore, I noticed participants tire quickly during workshops so they were not repeated but instead replaced by more creative approaches, such as PFM.

2.5.3 Participatory methods

A range of creative participatory methods were implemented during the study. Children engaged in the research when they were making films about local folkstories, as they had an opportunity to be physically active and use their imagination. Indeed, Boesch *et al.* [2008] suggest that theatrical techniques or role-play, such as those carried out in this study, are more applicable than written exercises for participants under a certain age and in traditionally oral societies. Using participatory methods with adults meant they played a part planning and facilitating the research which encouraged long-term interest in the work [Chambers and Reason 2008]. One method that was particularly effective at

encouraging this was PFM. Indeed, of the participatory methods used PFM engaged the highest frequency of people and spanned the widest age range. In addition it stimulated interest among individuals who had previously been adverse to the research taking place and provided a sense of project ownership among participants [Motschnig-Pitrik and Holzinger 2002].

Documenting local practices in the community through the medium of film and photography proved an important component of understanding local ethno-ecological perspectives. People used the camera to film topics of relevance to them which meant a number of environmental, social and cultural issues were identified in the process. They also took care in how the films were presented to ensure their contents were accurate and therefore provided highly reliable data sets. Using PFM in Mocagua and San Martín was an effective way of integrating research objectives (through the acquisition of qualitative data from video transcripts and discussions about films); conservation planning (by discussing local territory and the forest and sharing information to plan for the future); and human development needs (through the production of DVD's to be shown to potential funders and presented at meetings with stakeholders).

People enjoyed using the video camera and producing films. This was evidenced through the high number of films made in each community and the time people committed to making them. The method was easily adapted to enable all-inclusive participation and permitted a 'person-centred' approach [Dewing 2002][24]. Where preferred workshops were led by a local facilitator which meant participants taught each other how to use the camera without my supervision. This in itself provided another incentive for some people to take part as they liked the idea of using the equipment and work independently. People learnt new skills and abilities and shared their knowledge with each other. Most said they found the process rewarding and worthwhile and were keen to continue developing their skills once the study had ended.

[24] 'Person-centred' research is designed on an individual needs basis. It follows the values of independence, rights, coproduction and freedom of choice. This ensures all-inclusive participation by people of various abilities and provides the researcher with an opportunity to become familiar with people in the community on an individual level which generates a genuine understanding of the local society and culture [Dewing 2002].

2.5.3.1 Limitations to PFM

While the cost and practicality of acquiring professional recording equipment can present a limitation to carrying out PFM as a research method it is essential to have access to appropriate equipment when filming in a remote location such as ANP. The video camera used in the study was equipped with a 'flip-out' side screen enabling immediate playback and a long battery life which allowed eight hours of continuous filming. A spare fully charged battery was also carried during filming activities. Two moderately priced video cameras were purchased (Models: Sony DCR-HC27 Handicam mini DV Camcorder and Sony HDR-HC7) which somewhat restricted the locations they could be used in. Participants were advised not to take the equipment into flooded areas because of the risk of it getting it wet and permanently damaging it. Using electrical equipment of any kind is a risk in humid environments unless it is carefully stored and transported. The equipment was kept in padded air tight containers with sachets of moisture absorbing silica gel to avoid damage. The importance of carefully storing the equipment when it was finished was also explained to the people using it. The cost of an external microphone exceeded the project's budget which restricted the sound quality of the footage. To overcome this, videos were watched on a portable laptop with high quality external speakers. This was only feasible, however, when there was gasoline to run the community generator. Having a laptop with a high memory capacity and a long battery life was also crucial as it meant footage could be downloaded and edited on a regular basis. An external memory drive was used to back up data once a week. Films were burnt to DVD every month and stored in airtight boxes with silica gel.

Learning to use video recording equipment and make films required coordination, time and dedication by the researcher and local participants. Although every effort was made to be inclusive few people who wished to take part were unable to attend the workshops, participate in film projects or view community screenings due to other commitments. The first course of PFM workshops were mainly attended by women and young people. Men were later approached separately to arrange a time that suited them. Three screenings were held at the visitors centre so that a group of women from Mocagua who worked in the restaurant at the tourist lodge could watch films that their children, friends and family had made.

2.5.3.2 Ethical considerations

A number of ethical issues regarding property rights and access to knowledge arise when filming, or recording information of any kind, with human participants. These matters were acknowledged during the study and approached with due care and consideration. A general meeting was held in each community in the presence of the *Curaca* and *Cabildos.* The method was explained to the community and permission was granted for filming to be carried out. It was agreed that local participants would decide what went into the films. For the purpose of the study it was necessary to combine PFM with a number of more structured qualitative and quantitative research methods to ensure a data set that covered the main objectives of the study. To adhere to ethics research regulations participants previewed all the footage before public viewings took place. This provided a chance for them to request certain information be deleted or changed, or to request anonymity from the project. As with all research methods in this study it was explained from the outset that participants were free to withdraw from the filming activities at any time. Care was taken to ensure strict confidentiality when analysing the data by excluding the names of informants from written reports and disposing of raw footage [Medical Research Council of Canada 1998]. Where quotes are incorporated into the text the informant's name and age are given only where requested by the participant.

2.5.4 Possible improvements to research methods

Were the study to be repeated with more time and a bigger budget it would be beneficial for more people to learn how to use the video editing software and publish films. This could be taught during a workshop for those people interested. It would require having several computers with the appropriate software however, which could possibly be downloaded onto the schools' computers. Learning the final stage of the film-making process would enable people to practice independently and produce their own films. Having access to this kind of technology in order to communicate with the outside world through film and documentary-making gives a voice to marginalised peoples and educates others about the ways that indigenous people live.

While a moderate number of people participated in the research I would also have liked very young children to have been given the chance. However the rest of the community felt that 0-5 year olds would not be capable and decided against it.

There are a number of innovative methods that enable the participation of children between the ages of 0-5 years that may have been suitable to use in this setting but parents and teachers were adamant that they would not take part [Dewing 2002]. Another condition put forward by parents was that children's activities had to take place in the school grounds. This was because of previous issues with other researchers who took groups of children to swim in an unsafe watering hole in the forest. While the school provided a safe and secure environment for the research to take place it also limited the types of activities that could be carried out and meant that some children were automatically excluded from participating. Where possible, I tried to speak to these children in their homes or in the village but some were disappointed they were unable to join in the group activities and take part in the musical and theatrical performances.

Certain improvements could have been made to the research by broadening the data set I acquired. Carrying out research for a 12 month period would have strengthened the overall data and allowed for seasonal comparisons to be made. This may also have provided time to establish a regular weighing regime to collect quantitative data on the amount of meat and fish eaten by each family. Information about the sale and trade of bushmeat is also somewhat lacking from the data, however these details were difficult to access as people were often afraid of exceeding quotas or being fined for trading certain meats. While it would have been interesting to include this information I did not feel it was my place to report undisclosed data of this kind. Similarly, some events which I saw take place in the communities were not included in the thesis for confidentiality purposes as requested by participants.

Newing and St John [2013] report a substantial literature on inaccuracy in daily calendars similar to those that the women completed in this study (e.g. in health studies, Wiseman *et al.* 2005; development studies, Beegle *et al*. 2012 and ethnobiology, Shanley 1999; Menton *et al.* 2010). They describe imprecision caused by reporting fatigue, recall error connected to gaps or delays in completing the calendar, incomplete knowledge of the informant and intentional errors related to social and cultural norms or the illegality of consuming certain species [Newing and St John 2013]. While these errors may have occurred during the study such inaccuracies were limited by triangulating data using a range of different methods

rather than relying solely on one. They also suggest that hunting data does not often match what is eaten in the diet because of gifts of meat or cooked food, and non-cash barter within and beyond the community. For this reason, in this study dietary logs were used to acquire information on wildlife consumption rather than looking at hunting records.

2.6 Data Analysis

2.6.1 Quantitative data analysis

Data were quantified to enable analysis using SPSS version 17.0, by summing up the number of animal species named for each of the six value categories during categorisation tasks, and totalling the number of meals containing different meats recorded in dietary logs. Numerical data were checked for normality by running Exploratory Data Analysis (EDA). All data were non-normally distributed and could not be transformed, so non-parametric tests were conducted at the 5% critical level (when $p<0.05$ data are significantly different). Details of the analyses carried out for each type of data are given below. Additional information can be found in the corresponding chapters.

2.6.1.1 Species categorisation data

Two-tailed Chi-square tests were performed on the frequency tables generated from the data produced during categorisation workshops. This was done to identify disparities in the way animals were sorted by the sample population according to six categories (food, medicine, pets, arts and crafts, tourism and folklore). The purpose of this activity was to examine how species were perceived by local people according to their use and value. To assess if data from Mocagua and San Martín varied significantly Post-hoc Mann–Whitney pairwise comparisons (applying a Bonferonni correction) were employed to reveal differences between the length of the species lists written by participants for each of the value categories. These data were presented in the table as percentage values of the number of animals named by each community per value category from the total number of animals named. Frequencies were displayed in bar charts so that preliminary observations could be made. Tables were sorted by community (Mocagua and San Martín), age group and gender (boys, 5-15 years old; girls, 5-15 years old; men, 16-59 years old; women, 16-59 years old and elders, 60+ years old). This was to determine if elderly and young male and female participants compiled significantly different lists from each other or if the observed variance was down to chance. To further explore differences between the data sets, a Kruskal-Wallis ANOVA (corrected for tied ranks) was run for species, taxonomic class (mammals, fish, birds, reptiles and insects), order and category.

2.6.1.2 Dietary data

The frequencies with which different animal taxa were consumed were presented as percentages calculated from the number of meals taxa were eaten according to dietary logs kept by women. A series of bar charts were produced to allow for visual comparisons to be made. Taking sample size into account (to ensure expected frequencies greater than 5) Chi-square tests were run to determine differences between the frequencies that various taxa were eaten. This was repeated for food source (wild, domestic or processed meats and fish) and species. Comparisons were made between communities by running two-tailed Chi-square tests to determine any significant differences. The number of meals containing wild and domestic meat that were eaten in Mocagua and San Martín were compared by running a Pearson's Chi-square for two independent samples (2×2 contingency tables). This was followed by a Spearman rank correlation to assess the relationship between the consumption of wild and domestic meat.

Data recorded by women in Mocagua and San Martín were also used to compare the composition of meals according to taxonomic class (fish, birds, mammals, insects and reptiles), species and food type (wild, domestic or purchased). Those animals identified as food items in written lists were then examined against dietary records to observe similarities and differences, and from that make deductions about food choice and availability in the communities. As well as making observed comparisons for individual datum, values were calculated from list data and dietary data to form two columns showing the percentage number of species named in each case for different taxa. These were calculated from totals generated for each taxa from both data sets. To determine the impact of traditional taboos and hunting quotas set by the UAESPNN a table was generated comparing their frequencies. These are referred to 'old' versus 'new' respectively). This information was displayed alongside information provided by participants and collated through observations in the communities to determine whether they were adhered to. Assumptions were further validated through qualitative data methods, details of which are given in **section 2.6.2** below.

2.6.2 Qualitative data analysis

Dialogues were transcribed and categorised in Excel according to five general topics to identify themes from the data. These were: conservation, education, economy, culture and food. These data include conversations and interviews written in notebooks and recorded on a voice recorder, and footage documented using the video camera. Quotes, anecdotes and observations that supported quantitative findings were also selected from diaries and notebooks to strengthen numerical data sets. Information that contradicts these data are included as comparative evidence. These were recorded in a separate spreadsheet along with details of the informant, location and topic. This allowed for data to be sorted according to age, gender, community, animal species (if applicable) and category. Videos were also sorted into general categories, as determined through the chosen topics for each film-project so local issues in each community could be compared.

Descriptions provided by informants when discussing animals as prey were organised according to species' characteristics classified as positive or negative traits. This information was used to determine desirable and undesirable food items. Comments and quotes about local restrictions on resource use and changes to the local diet were also recorded. This enabled comparisons between traditional taboos and the introduction of new regulations and quotas. Qualitative data obtained outside of interviews were included for supplementary purposes to strengthen data sets. Visual data recorded through drawings, photographs and film were stored separately and referred to during the analysis of written and observational data. In this way, information acquired through quantitative and qualitative methods was triangulated. To compare the different ways people adapt to environmental and social changes in Mocagua and San Martín I compiled six Family Profiles (recording family size, household activities, economic solvency, amongst other things) using observations made whilst staying with different families. Two of these are referred to as case studies in **section 6.4.3.2**.

2.6.3 Justification of statistical tests

The methods employed to obtain data for this thesis defined the statistical tests which could be used when handling them. Here I provide justifications for my choice of statistics to analyse the data sets.

2.6.3.1 Non-parametric tests

Non-parametric tests were conducted to ordinal and categorical data sets and to compare ranks of importance and preference as they may be applied to non-interval data. Data did not fit a normal distribution therefore median values and standard deviations were calculated. The median is the statistic most appropriate for describing the central tendency of scores from non-normal distributions since it is not affected by changes of scores above or below it, as long as the number of these scores remain the same. Although less powerful than parametric tests, non-parametric tests do not specify conditions about the parameters of the population from which the sample is drawn. The only assumption made by ranking tests is that the observed scores are drawn from an underlying continuous distribution, a condition which parametric tests also assume. Furthermore, most data were drawn from a large sample population and so were well-suited to non-parametric analyses [Cochran 1952: 110 cited in Siegel 1957]. Probability statements obtained from non-parametric tests are given as exact probabilities regardless of the shape of the population distribution. Moreover, non-parametric tests can be used to treat samples that consist of observations from several different populations, i.e. data sets from different communities or workshop groups. None of the parametric tests can handle this type of data without requiring unrealistic assumptions to be made [Siegel and Castellan 1988]. Indeed Siegel and Castellan [1988] suggest social scientists rarely achieve the sort of measurement which permits the meaningful use of parametric tests, and therefore nonparametric statistical tests provided a vital role in scientific research.

2.6.3.2 Kruskal–Wallis One-way Analysis of Variance

A Kruskal–Wallis ANOVA, corrected for tied ranks, was employed to analyse the length of species lists generated by sample pairs during workshops, for each of the six value categories. The paired variables: community (Mocagua/San Martín), sex (male/female) and age range (adult/child) were compared. The number of participants from each community and the size of each workshop was inconsistent. This test was deemed appropriate therefore as Kruskal–Wallis can be applied to examine groups of unequal numbers [Siegel and Castellan 1988]. It is also a reliable test for ordinal values where *k* independent samples are from different populations with respect to their averages, and can be used to test data sets with more than two independent samples. The test did not however identify

where the differences occurred or how many there were so Chi-square analyses were used to determine significant differences between males and females, and the elderly and the young. Chi-square tests were chosen because the sample size was greater than 20 and the values were given as independent category frequencies expected to be more than five. The counts of categorical responses between independent pair-wise groups (males and females, adults and children, men and girls, women and boys, men and boys, and women and girls) were examined through a series of two-way contingency tables.

2.6.3.3 The Mann Whitney U non-parametric test

To compare the number of species named by participants from San Martín and Mocagua during species categorisation tasks a Mann Whitney U test was conducted on the data. The Mann Whitney U is appropriate where data are ordinal and assumed to vary suitably from homogeneity. The data sets derived from the two communities were independent, and the lists under study were given as frequencies in discrete categories [Siegel and Castellan 1988]. This was followed by a Chi-square cross tabulation test for two independent samples to determine the origin of the observed differences. In addition the expected frequencies were sufficiently large for this test to produce reliable results (n>40); the limiting power distribution of Chi-square means χ^2 tends towards 1 as 'n' becomes large [Cochran 1952].

2.6.3.4 Spearman rank correlation coefficient

Quantitative dietary data were interpreted using a two-tailed Chi-square procedure to test the likelihood that different types of food were eaten according to chance. The number of meals containing different foods were calculated and cross tabulation values were generated to identify where the main differences were. A Spearman rank correlation was calculated to see if there was any association between the types of foods (wild/domestic meat and fish) in people's diets. The Spearman rank correlation is an efficient measure of association where individuals or objects under study are ranked in two ordered series. When compared with the most powerful parametric correlation, the Pearson *r,* it is about 91% reliable [Hotelling and Pabst 1936]. Data were corrected for ties to counteract the inflation of r_s otherwise caused through a high frequency of equal ranks [Siegel and Castellan 1988].

Chapter 3

The Tikuna worldview

Chapter 3: The Tikuna worldview

3.1 Introduction

3.1.1 Preliminary observations

During the pilot study in March 2007 I observed Tikuna hunters from Mocagua and San Martín keen to earn a salary through work as forest guides in research, tourism and conservation even though a priority aim of these initiatives was to reduce hunting practices. This led me to question how, in current times, indigenous people interact with animal species, why wildlife is important to them and how transformations in local conditions influence decisions over resource use and traditional practices. My preliminary observations in ANP suggest that wild animals fill a number of roles and that commoditising nature and earning money are becoming increasingly prevalent practices for the Tikuna. These topics were talked about frequently during conversations with local people and seen taking place in both Mocagua and San Martín. In this chapter I discuss the contemporary 'Tikuna worldview' presenting data acquired during the pilot study whilst trialling a number of methods for their effectiveness, such as participative group discussions and one-to-one semi structured interviews. I do this by first describing a number of theories on human-nature relationships in order to explore how worldviews develop and establish what factors contribute towards people's conceptions of nature. Consequently I examine the key aspects of human-wildlife relationships in ANP as described by local people and finally I explain how the data acquired during the pilot study shapes the theme of my thesis and provides the foundations for the main study that follows.

3.1.2 The structure of worldviews

Information acquired through social relationships and environmental associations formed at a young age proscribe a set of values which stipulate people's moral obligations concerning other species and the environment. According to this theory it is the source of our core beliefs and our interactions in the world that create our worldview and dictate our actions and attitudes towards other animals [Descola in Kohn 2009]. Thus our worldview is influenced by a combination of personal and societal experiences which depend upon local conditions and the circumstances

with which we are presented [*ibid.*]. Among human societies living in protected areas, such as the Tikuna in ANP, a combination of elements determine people's environmental, socio-economic and cultural realities. Hunting is a 'rite of passage' into manhood, while young women more typically practice agriculture and cultivation, making handicrafts, caring for pets and children and passing these skills on to their infants and siblings [Caldecott 1988]. As circumstances adjust however, people are exposed to alternative opportunities and develop new ideas and different requirements. While hunting and preparing food have been documented as vital to these processes, strengthening bonds between humans and nature and establishing status and social roles [Fitzgibbon *et al.* 2000 cited in Robinson and Bennett 2000], these processes are also susceptible to change. Environmental changes not only influence the way people relate to each other but also shape their concepts of nature and how they perceive the world around them. People assume multiple perspectives of their environment according to their beliefs, knowledge, understanding and the opportunities that arise [Descola 2009a]. Indeed, Descola [2009a] recognises that although these ontologies are somewhat fixed in nature, certain variables are continuously interchangeable, "*[A]s humans we constantly change positions. The way we engage with other species alters our understanding of the world and brings different meanings to future engagements and interpretations"*.

3.1.2.1 Transformations

In his 2006 publication Descola proposes that discrepancies in the way we perceive the world are created through our exposure to different experiences, and these manifest themselves in the way we relate to our environments. When we interact, socialise and share ideas, what were previously 'foreign' concepts to one group of people eventually become part of a collective way of thinking. Abram [1997] writes, *"Our direct experience is necessarily subjective, necessarily relative to our own position or place in the midst of things, to our particular desires, tastes, and concerns"*. Adopting an anti-modernist standpoint Latour's early work encouraged scientists to re-think and re-evaluate their understanding of the human mental landscape by blurring distinctions across fields and disciplines. In the 1993 translation of his 1991 book "We Have Never Been Modern" Latour argued that modernity made unrealistic 'dualist' distinctions between the inseparable coalescence of nature, culture and society. Instead, he suggested that the

interaction of people, things and concepts, which he described as a “Parliament of Things”, created hybrids of each other [Latour 1993]. He added to this that people’s behaviours were dictated by learnt values which acted in tandem with and were inseparable from their worldviews, the environment and the things around them [*ibid.*].

3.1.2.2 Sedentarisation

As mentioned in **Chapter 1** [**section 1.6.5**] the communities of Mocagua and San Martín have been described as “*Among the least traditional in the Colombian Amazon*”, involved in trade with global markets, participation in conservation and work in tourism and research [Ungar and Strand 2012]. The Tikuna are accustomed to a range of commodities, their children receive a modern education and go to church, while some families buy imported, processed food and rear domestic animals for meat. In fact Gruezmacher’s [2008] report suggests that most adults in Mocagua and San Martín hope to acquire economic stability through various terms of employment, while young people aspire to receive a further education. These conditions have transpired since the very early sedentarisation of the Tikuna people in ANP; a process that has been well documented as the root of cultural, societal and environmental collapse globally [Azarya 1993]. Aside from increasing the impact of hunting on wildlife through repeated harvesting in an unchanging patch of territory, coupled with a growing human population and the introduction of modern hunting and fishing practices, sedentarisation has enabled the widespread development of contemporary practices and indoctrinated young people with ethics established through the state, religion and environmental education [Khazanov 1998].

The ongoing destruction of indigenous peoples' ways of life constitutes a decline in human diversity and contributes to the hegemony of Westernised civilisation. There are many examples of how forced sedentarisation has had detrimental effects on human societies [Schultz and Lavenda 2008]. For example, the nomadic Tikuna hunter-gatherers of Mocagua and San Martín adopted a sedentary lifestyle in the 1950’s through policies instituted during Western colonialism and improved access by the government. Similarly, the fate of many formerly nomadic groups has been determined through occupation by foreign settlers and government mandates; The Negev Bedouiin in Jordan, Israel and

Egypt, the Bashkirs in Soviet Russia, Tibetan nomads in China, the Babongo in Gabon and the Baka in Cameroon have all been affected [Schultz and Lavenda 2008]. These changes have caused social decline, weakened ethnic identity and taken away indigenous autonomy over land and natural resources. To understand the impact of these transformations a look at how human-nature relationships have evolved throughout history is examined below.

3.1.2.3 Agriculture and education

A number of theories exist, as attempts to explain why human beings behave how they do towards nature other animals. Shepard [1998] suggested that changes among early peoples and their relationship with the forest occurred because of the modification of food acquisition techniques. He proposed that human societies first began to 'separate' from nature 5,000 years ago during the Neolithic Stone Age with the widespread adoption of agriculture; "*Agriculturalists developed a fearful attitude towards undomesticated nature as they saw all things that were not controlled by man as being invasive and a threat to their tame and managed crops*" [Shepard 1998]. Describing places outside the safety of the human domain as 'wild' or 'wilderness' (originating from the concept '*wild-deor*' meaning '*wild'*=untamed and '*deor'*=savage beast) made people fearful of the forest. This had ramifications for foraging and hunting as people chose to domesticate and cultivate foods closer to their homes instead [Nash in Harding 2006]. Traditional practices and knowledge systems were neglected as new skills were learnt that supported an agricultural lifestyle.

The invention of modern education is also said to have altered the way humans view nature because it encouraged people to stop relying on their primordial perceptions and adopt instead a 'rational' worldview. Abram [1997] has suggested that the invention of the formal writing system caused the deterioration of communication with other species [Abram 1997]; "*The phonetic alphabet was a major factor in the breakdown of animism, as the written word displaced our intuitive animistic ways of communicating with the natural world".* He wrote; "*Now the printed page begins to speak to us as vividly as trees, rivers and mountains once spoke to our more indigenous ancestors".* Greek philosophers of the fourth century BC supported the idea that a seamless interconnected hierarchical ordering of the cosmos existed. Plato wrote; "*The human soul is connected to the*

souls of animals and plants through the Anima Mundi[25] *or soul of the world*". They also believed, however that all non-human species had lesser value than humans because they could not read or write and were not educated in the same way as humans were [Harding 2006]. They proposed that, "*'Men who have no use for philosophy' were 'failed men' and would be reincarnated as animals"* [Abram 1997 cited in Harding 2006] so assigning to the idea that humans were different too and thereby separate from other animals in the natural world.

3.1.2.4 Religion and philosophy

Religion has also had a highly influential role on the human-nature interface. During the Middle Ages philosophers from the Christian Church inaugurated dualistic environmental concepts in the West that transformed people's ideas about nature. The Church proclaimed that heaven was "*[A] place where all things sensuous and meaningful about the world exist*" and that the Earth was merely "*[A]n illusion compiled of soulless forms or objects*" [Harding 2006]. Passages in the Bible taught people that God created nature to demonstrate his own divine prowess, and that humans were therefore superior to all other species. These beliefs impelled a form of hierarchical animism where humans occupied a privileged position halfway between physical matter and the spiritual world [Carr-Gomm 2009]. Later came The Protestant Revolution which further drove society away from nature and ensured distinct parameters were sustained between humans and animals [Abram 1997]. More recently, missionaries who travel to indigenous communities to 're-educate' and 'civilise' local people have become common practice.

In 1971 Commoner published 'The Four Informal Laws of Ecology' in which he described how capitalism, with its focus on reductionism, the material and the controlled, actively opposed the unconfined free-flowing essence of nature [**Appendix VI**]. In support of this, Foster [2005] claimed latterly, that a reliance on commercial goods and global trade caused detrimental acts towards the environment which were driven by money. Indeed, Sullivan [2011] proposes that the divide between humans and nature has been most noticeably exacerbated by the growth of industry and capitalism. Current developments proscribed in present

[25] The term *Anima Mundi* is used to denote the Earth as being a living entity with a soul and intelligence. As a female she is regarded as having given birth to all living worldly matter [Harding 2006].

day Western science similarly support a dualistic disposition rather than those ideas explained through holistic reasoning. Indeed Harding [2006] shows that modern science, as we know it today, originates from many early ideas developed during the Scientific Revolution in the sixteenth and seventeenth century. He suggests that all scientific explanations about ecosystems and biology are rooted in Descartes' 'Cartesian Dualism' of 1641 in which Descartes perceived animals as unconscious machines without feelings or souls. Harding [2006] writes, "*During the Scientific Revolution nature was quantified into numbers to make sense out of the misleading secondary qualities' that people experience such as empathy towards other animals*". The above theories pose several explanations to account for the changes seen in human societies and how they relate to nature, caused by the global processes of development and industrialisation [Harding 2006; Sheppard 2000]. Indeed, it is through a combination of these processes that the worldviews of a large number of societies have formed. These philosophies offer reasons for our behaviours, beliefs and decisions over resource use. They present some compelling ideas about the impact of sedentarisation and development on human-nature interactions, some of which will be referred to below, to interpret data collected during the pilot study in Mocagua and San Martín.

3.2 Methods

3.2.1 Opportunistic data

The bulk of data in this chapter was obtained through a single conversation (195 minutes duration) which took place with a group of hunters from Mocagua and San Martín (n=12) during preliminary visits to the region in June 2007. Unlike the organised activities and group discussions that were planned during phase one and phase two of the research this event occurred spontaneously. The majority of data were acquired from people over the age of 40 (only two participants were younger than this) and participants were free to express their ideas and opinions however most suited them. Conversations in small groups better suited the elderly than written tasks did, and most older adults were culturally more accustomed to talking through their ideas rather than explaining things in writing. That said, during the discussion participants drew a schematic diagram to help clarify their interpretations of human-nature relationships. The diagram was a helpful tool to express the group's collective ideas and a useful point of reference during and following on from the discussion. Further data were acquired opportunistically through conversations, observations and semi-structured interviews with informants of different ages [16-63 years] between March 2007 to June 2009 [detailed in **Chapter 2**].

3.2.2 Limitations

All twelve participants were male hunters between the ages of 36 and 63 years which created a sampling bias [Cortes *et al.* 2008]. However for the purpose of this study these data provided an interesting starting point from which to make comparisons between the perceptions and opinions of different age groups. Furthermore, the points raised by the hunters were relevant for further investigation with other people in the communities from different demographic groups. To carry out a valid ethnoecological study on human-wildlife interactions and local environmental perceptions it was imperative to acquire data unimpaired by my own cultural disposition. The study was therefore participant-led whereby data provided by local people during the pilot study were used to guide and structure the main body of the thesis.

3.3 The contemporary Tikuna belief system

The illustration drawn by hunters from Mocagua and San Martín (n=12, 36-63 years) during conversations about the Tikuna's relationship with their environment is shown below [**Figure 3.1**]. A scan of the original drawing is provided in **Appendix VII** but as this was too unclear to be used in the final text a precise replica is presented here instead. The main themes conveyed through the drawing are discussed below.

3.3.1 Shamanism and reciprocity

A recurring topic mentioned by informants was the idea that hunters are connected to their environment through reciprocal relationships governed by the shaman. This is shown in the drawing by a number of interconnected arrows which represent undefined boundaries between species, entities, places and objects [**Fig. 3.1**]. Participants drew the Tikuna hunter woven into the forest by a complex set of interactions and exchanges which create his reality. The village, the family home and the *chagra,* were also central to the drawing. One hunter explained, "*The shaman mediates and overlooks these exchanges and ensures a balance is maintained. This is represented by a crown above the Tikuna's head*" [Hunter, 45 years of age, San Martín]. While there exists no practicing shaman in either community such comments suggest some form of shamanism persists and, according to older people in Mocagua and San Martín, it still plays a significant role of negotiation between the hunter and his prey. The significance of Shamanism to Amazonian peoples is explained by Descola through the following statement; "*The Shaman from some Amazonian peoples transforms the inherently problematic meat into less problematic foodstuff*" [1996: 91-2].

Among other things, participants expressed their opinions about the negative influence of money, trade and outside intervention on traditional Tikuna identity, culture and belief systems. The hunters said that since the demise of the last shaman few people adhere to animist ideals, however, apart from a few remaining elders. They suggested the absence of shamanism in their communities has caused people to adapt hunting and fishing methods and carry out unsustainable practices; *"Now people take as much as they can so they can sell it. They use huge nets to catch many fish and guns and dogs when they hunt*" [Hunter, 63

years of age, San Martín]. Another informant explained, "*Before, the shaman made sure that animals were not over hunted. Now people just take what they want*" [Hunter, 62 years of age Mocagua].

3.3.2 Animism and local practices

Participants talked about how living organisms are on a par with humans and that this establishes connections between the Tikuna and wild animals. Indeed, Lima has [1998] proposed that, "*The Tikuna have a very distinct notion of humanity. Their general concept of nature is that it is the context in which all life evolves...human beings are by no means a special species living on earth."* Informants discussed how the consumption of wild foods and the exchange of natural resources with *dueños* or spiritual owners links them to the environment and that these connections are maintained through traditional practices such as hunting, gathering, fishing and gardening. One hunter explained; "*The Tikuna are related to and share an existence with all things including the animals and the dueños*" [Hunter, 51 years of age, San Martín]. They see this as a network of symbiotic relationships that connects the hunter to his environment; double ended arrows represent affiliations with the cosmos (depicted by the moon, the sun and the stars), the forest (represented by a tree and a bird), the river (shown as a curving line and a dolphin) and the *chagra* (depicted by plantain) in **Fig. 3.1**. This reflects a rationale guided by holistic reasoning derived from animism [Berry 2009] [**Chapter 1**, **section 1.3.5**]. Indeed, Descola [2009b] describes animism as being built upon the nurturing of reciprocal relationships with other species, while Harding [2006] contends that animists typically construct close connections with their environment which shape the organisation of society.

It is suggested that continuity between species is only understood where ongoing engagements and relationships between people, their environment and other species are nurtured and explored [Dwyer 2005]. One of the ways in which hunters from Mocagua and San Martín do this is by offering a gift (usually tobacco) to the prey's spiritual guardian in return for the animal's 'clothes'. The 'clothes' or outer layer of the animal is what constructs its physical form in the human realm. If maintained, these agreements ensure a plentiful supply of prey to the community. The existence of several worlds is central to Tikuna concepts of human-animal interactions. For example, the local hunters also explained that animals' bodies

undergo physical transformations after death and pass into another world, different to that of the human or animal realm previously mentioned. One elder said, "*When the sloth reaches an old age he crawls down from its tree into the water and becomes a giant Gamitana fish*." Another explained, "*If you hunt 'zogi zogi' (Callicebus torquatus lugens) you have to collect its body quickly before it goes away. If not it will disappear and you will lose it!*" [Hunter, 40 years of age, San Martín]. Several forms of animism exist, depending on a combination of environmental and societal factors [Bird-David 1990]. Kohn [2009] reports that for the Achuar of Peru "*Humans are considered part of the whole rather than separate from it",* whilst Rival [1997] convincingly explains how intimate relationships with nature structure the design of Huaorani kinship systems, the practice of warfare and the performance of local rituals. One of the most extreme examples is documented by Cormier [2003] among the Guajá of Brazil. She describes how Guajá women adopt infant monkeys as kin by nurturing and breastfeeding them and, she claims, these intimate practices are integral to the cognitive and social development of young Guajá children [Cormier 2003].

3.3.3 Commodification of wildlife and outside intervention

The hunters described how resource use, which was once exclusively a process of simultaneous negotiation with the forest *dueños,* placed limitations on what people hunted. They explained however, that money drives people to reassess these relationships and that a widespread desire for commodities, such as machetes, gasoline and financial solvency, inhibits reciprocal exchanges with nature. According to the hunters, outside intervention and contact with non-indigenous societies are also a major contributing factor to these changes, while education, religion, tourism, research and conservation contribute to the breakdown of reciprocity between species, as people are encouraged to give up their traditional lifestyle in place of seeking economic gains. One participant explained; "*These things work against the traditional worldview, upsetting the indigenous relationship with the environment*" [Hunter, 42 years of age, San Martín]. They are labelled as 'external influences' in the diagram and are shown driving a split between the Tikuna and the forest [**Fig. 3.1**].

Figure 3.1 The Tikuna relationship with the natural environment, illustrated by hunters from Mocagua and San Martín during a group discussion in May 2007, ANP, Colombian Amazon

The hunters' explanations reflect some of the ideas proposed earlier in this chapter such as Shepard's [1998] theory that modern agriculture separates people from 'wilderness'; Abram's [1997] notion that modern education alters the way people view and experience the natural environment and Harding's [2006] proposal that The Church has worked to alter indigenous people's intricate relationship with nature [**section 3.1.2.4**]. The participants shared strong opinions about the impact of projects, run by foreigners, on local people's values and belief systems. One informant said; "*People are discouraged from hunting and keeping wild animals as they are told that these activities are damaging the forest. The people that say these things don't understand...but we [the hunters] know the importance of them for our cultural identity*" [Hunter, 42 years of age, San Martín]. While a few informants also spoke about the positive aspects of such projects, including the provisioning of work and opportunities to earn money when natural resources are limited, these comments were typically followed by a remark about how outside intervention is damaging to the local culture and traditional way of life.

In agreement with the hunters, a number of authors have also proposed that outside intervention encourages local people to value nature as a commodity and foster anthropocentric ideals [West 2008; Sullivan 2006; Foster 2005]. Both Sullivan [2006] and Foster [2005] published research about the commodification of wildlife and its invalidation of local social and cultural values about the environment [Sullivan 2008, 2006; Foster 2005] [**section 3.1.2.4**]. Indeed, Ungar and Strand [2012] claim the majority of research conducted in ANP encourages local people to view research opportunities as "*no more than a means to earn money*". In her study about livelihood strategies in ANP Gruezmacher [2008] reports that, "*[L]ooking for economic alternatives is now the main concern for people in Mocagua and San Martín*." She suggests that wildlife, once viewed as a source of food by local people and valued for its subsistence use in crafts and medicines, has since become an important economic commodity [Gruezmacher 2008]. It seems money is key to shaping local perceptions, not only in ANP, but worldwide; **"***Money was designed as a means of exchange and a measure of wealth. Somehow that has changed; what was once solely a means to an end has become the end itself"* [Kumar [2012].

3.3.4 Education and Western ideologies

The final point made by the local hunters during these conversations was that children are not learning traditional knowledge about the forest and show little interest in Tikuna culture because of state education and Catholicism. One hunter said, "*Losing our tradition has changed the young people's relationship with nature. They learn from books and things their parents tell them but they are not interested in seeing these things for themselves"* [M. de Aguila, 55 years of age, Mocagua]. Indeed, in ANP the government and missionaries have worked persistently to provide indigenous children with a state education taught from a modern curriculum. Parents are encouraged to send their children to school to learn about nature with a strong focus on Western ideology and little focus on traditional indigenous beliefs. Several publications have highlighted the differences between indigenous belief systems and Western ideologies taught through the church and education and an array of literature exists on the topic [Lertzman 2010; Nadasdy 2005; Umeek Atleo 2005; Davidson-Hunt and Berkes 2003; Pierotti and Wildcat 2000; Goulet 1998; Suzuki and Knudtson 1992; Basso 1977]. Indeed, Nadasdy [2005; 2003] claims that Western values taught through a modern education are based upon anthropocentric worldviews tied to commodities and personal gain, whilst Sullivan [2008] contests that while traditional indigenous practices foster spiritual connections with the environment Westernised ideologies breed materialism and disengagement with the natural world. During group discussions some hunters suggested putting procedures in place to protect traditional practices and beliefs; "*We need to make rules to fortify our community so that outsiders don't make decisions. This would act as protection for the community and our traditions*" [Hunter, 36 years of age, San Martín].

The conversation with the hunters prompted a number of ideas which suggest that people's environmental perceptions in Mocagua and San Martín are the result of multiple interwoven factors that operate at various levels in the community and forest. These include a combination of ideas derived from the traditional Tikuna belief system (referred to by hunters in **Fig. 3.1** as 'positive') alongside Westernised notions introduced through a history of contact with non-indigenous peoples (referred to by hunters in **Fig. 3.1** as 'negative'). It showed how relationships with wildlife are governed by the shaman for some people who sustain traditional worldviews, whilst human-animal interactions are influenced by

money, education and employment for others. As well as causing conflict between stakeholders this creates conflicts between local people and should therefore be closely monitored.

Table 3.1 summarises the main features depicted in the diagram [**Fig. 3.1**] and provides an interpretation for each of their meanings.

Table 3.1 A summary of themes discussed by male hunters from Mocagua and San Martín explaining their relationship with the forest in ANP, Colombian Amazon [depicted in Fig. 3.1]

Theme	Visual representation in Figure 3.1
1. Shamanism	A crown above the Tikuna's head represents beliefs and practices governed by the shaman.
2. Reciprocal relationships	Double-ended arrows between the Tikuna, the forest, the river and the cosmos indicate endless possibilities for reciprocity between species.
3. Animism	The Tikuna is interchangeable with other species. This is illustrated through a web of arrows that connect him to his community, the river, the forest and the cosmos.
4. Commodification of nature	Material goods (represented by a motor, a machete and dollar signs) indicate how trade, the commodification of resources and the impact of money compromise the relationship the Tikuna forge with their environment.

3.5 Conclusions

The information in this chapter poses a number of questions about human-animal interactions in Mocagua and San Martín, such as: How do people's perceptions of nature differ? Do changes in the local diet and traditional practices affect people's associations with animals? And, what are the implications of outside intervention such as tourism and conservation on these relationships? The data so far imply that the different components shaping people's worldviews are critical to the outcomes of human-animal interactions, and from this a number of hypotheses can be deduced. Tikuna tradition and how local people use and perceive other species will be examined in **Chapter 4** in order to gain a deeper understanding about the relevance of ritual and practice in upholding reciprocal relationships between people and wildlife in ANP**.** The influence of shamanism and traditional beliefs on human-nature relationships was identified by participants as crucial to my understanding of local concepts about nature in Mocagua and San Martín. These ideas will therefore be further explored in **Chapter 5,** alongside the significance of newly introduced epistemological approaches in ANP and quantitative comparisons between the environmental perceptions of adults and children. Money, the commodification of wildlife and outside intervention will be discussed in **Chapter 6** as well as the impact of tourism and outside intervention on people's attitudes towards wildlife and conservation. This will be quantitatively analysed by testing variations in decisions over resource use within and between communities. These objectives are summarised in **Table 3.2** alongside the associated aims of the thesis, which are set out for analysis in **Chapter's 4** - **6**. **Chapter 7** will provide a discussion to the findings presented in the previous chapters.

Table 3.2 Hypotheses and aims established through group discussions with hunters in Mocagua and San Martín ANP, Colombian Amazon (May 2007)

	Research Aims	Hypotheses to be explored
1	Examine local perceptions about non-human species and the environment and determine how these are constructed.	**Chapter 4** i) Wildlife is valued and categorised in various ways by people from Mocagua and San Martín. Contact with non-indigenous societies adds to the complexity of people's ideas about wildlife. ii) A web of interactions links the Tikuna to the forest and other species through various beliefs and practices. These are guided by both shamanism and westernised ideas about conservation and the value of wildlife. iii) Hunting, keeping wild animals as pets, preparing and sharing foods and upholding exchanges with spiritual ancestors (*dueños*) mean people maintain close bonds with nature. As these practices change so too do local attitudes towards wildlife.
2	Identify factors shaping local worldviews and how they are influenced by cultural and historical experiences.	**Chapter 5** i) Disparities exist between the ways old and young people in Mocagua and San Martín classify wildlife because children learn about nature through pedagogical processes different to those experienced by the elderly. ii) Older people describe folk taxonomic classification derived from traditional knowledge while young people construct their views and opinions about wildlife based upon education, conservation and tourism. iii) The absence of a shaman in Mocagua and San Martín means local people's perceptions of wildlife and how they treat other animals have transformed in recent years. This has created the cause for new interactions between people, animals and the forest in ANP.
3	Consider how modifications in socio-economic and biocultural landscapes affect people's attitudes towards wildlife and conservation and their decisions over resource use.	**Chapter 6** i) As environmental conditions deteriorate and fewer natural resources are available in local communities, people establish different relationships with wildlife and adopt alternative livelihood strategies. ii) Where local people have access to jobs in research and tourism they also have less time to hunt, fish and grow food. Precedence is placed upon the commodification of wildlife through these activities, however where these opportunities are limited alternative initiatives are developed. iii) Conservation, research and tourism have positive and negative effects on local communities and wildlife in ANP therefore local people have mixed views about these practices. People's attitudes depend upon their personal experiences, environmental perceptions and socio-economic circumstances.

Chapter 4

The local use and categorisation of wildlife

Chapter 4: The local use and categorisation of wildlife

4.1 Introduction

This chapter looks at the use of wildlife in Mocagua and San Martín and how this shapes people's perceptions of other species. This idea is explored by examining the ways people categorise and name animals, how they interact with wild and domestic species and the practices and beliefs involved in establishing these relationships.

4.1.1 Labelling and categorising animals

4.1.1.1 Identifying wildlife

Wildlife fulfills multiple roles for indigenous people who rely on natural resources. Animals are used in medicines, crafts, wizardry and kept as companions. Some are engaged with on a daily basis whilst others are involved in specific practices or associated with particular beliefs. The role of wildlife in human society is integrated into a structure of social values driven by human perception, how we relate to other species and where we see ourselves physically, mentally, culturally and spiritually, in relation to animals [Le Gros Clark 1968]. For example, rules that dictate which species are palatable foods and which are repulsed or avoided vary hugely between different cultures [Safran-Foer 2010]. Consequently animals mean different things to different people and are addressed accordingly. Dwyer [2005] proposes that the labelling and recognition of species reflects how we interact with them and their categorisation according to utilitarian application. This, in turn, creates the basis of society's interpretations about other species and the environment. He claims that when an individual detects similarities between organisms these are authenticated through naming and engagement in the world; "*In the imagination those things appear as related, as being in some sense like one another. The relationship is metaphoric but may be concretized, it is perhaps given a label, a name. And, henceforth, that imagined relationship is established in the mind as a thing that contrasts with all other things in the world"* [Dwyer 2005: 18].

4.1.1.2 Early theories of use categorisation

The diverse literature published on the categorisation and labelling of the natural world highlights the importance of understanding people's perceptions of the environment, especially when exploring the role of wildlife, which serves various functions and representations in society. For example, in 1992 Berlin distinguished between 'special' and 'general' purpose use categories for wildlife e.g. dietary, medicinal or ritual for the former, compared with morphology or linguistic order for the latter. Berlin's work [Berlin 1992, 1978, 1973; Berlin *et al.* 1974] has been criticised however for placing restrictions on a comprehensive understanding of folk classification by adopting too rigid a theoretical framework [Dwyer 2005; Hyndman 1984]. Some suggest Berlin's theories bred polarity and encouraged anthropologists to ignore classification systems based upon continuity and holistic states of existence. Contrary to these opinions, authors such as Ellen [1993] and Ingold [2000] described non-uniform, dynamic social and ecological associations between indigenous peoples and nature, while through his study of the Nuaulu of south Seram Ellen [1993] highlighted the importance of applying diverse research methods to support these systems. More recently, with the development of enthnoecology, scientists have focused on reporting on the heterogeneity of indigenous classification and categorisation processes. Indeed, Dwyer [2005: 11] suggests, "*The aim of ethnoecology is to understand and explain ecology as experienced and, ultimately, should reveal the diversity of human ecological experience*". This diversity is evidenced in the many ways that different groups of people use and interact with wildlife.

4.1.2 How people use and interact with wildlife

4.1.2.1 Traditional practices

The term 'Culturally Keystone Species' (CKS) describes a plant or animal which is integral to the culture of a society because of a particular practice or belief with which it is associated. Furthermore, it implies that the absence of a particular species has the propensity to impair the longevity of a society's culture, and presupposes that customary practices are constitutive to human-animal affiliations [Cristancho and Vining 2004]. Indeed, research has shown that indigenous people are intimately engaged with animals through traditional practices such as hunting, fishing, trapping, gathering and decisions over pet-keeping, all of which influence

human organisation and how people relate to nature (e.g. Kohn [2007] for the Runa of Amazonian Ecuador; Descola [2005] for the Achuar hunters of Peru; Corrall [2002] in South Korea; and Ilomäki [2002] in Finland). In her study of Finnish folklore Ilomäki [2002] contends that the relationship between a hunter and his prey is paramount to the forging of human-animal bonds centralised around death to obtain food, while Descola [2005] suggests the Achuar hunters of Peru are in constant conflict with their prey. Descola [2005] explains, "*They* [hunters] *continually avoid revenge from the forest, and this is reflective of their dealings with other humans*". As well as providing protein, the hunter-prey relationship therefore establishes rules about how people perceive and experience wildlife, their environment and each other.

4.1.2.2 Gender specific roles

Various social and cultural rules dictate how people relate to wildlife. Previous studies have suggested that the roles of men and women in Amerindian society form distinctions between animals kept as pets and those killed for prey [Erikson 2000; Verswyver 1983]. For example, Verswyver [1983] reported that in Kalapo society men received the rights to consume certain body parts of prey whilst women were expected to care for animals in the home, and that by taking care of household pets women reversed the destructive role of their male companions [cited in Erikson 2000]. Pet animals were said to appear to Kalapo women in their dreams thus forging inherently close bonds between them, while only men could communicate with wildlife in the forest [*ibid.*]. My observations in Mocagua and San Martín suggest food preparation is only ever carried out by women among the Tikuna, even though a number of men are capable cooks. Similarly the women and children are chief caretakers of livestock and pets, while typically it is only the men who go hunting. Indeed, when a woman announced she had been hunting with her husband the shocked reactions this provoked among other women in her community made it clear that hunting is considered predominantly a male activity.

4.1.2.3 Diet and food choice

The most common use of wild animals by people worldwide is as a source of protein [Safran-Foer 2010]. Many factors influence what people eat, including cultural practices, beliefs, social norms, taboos, prey availability and personal likes and dislikes. Studying local diet therefore provides a comprehensive insight into

people's perceptions of animals. The impact of food choice, hunting practices, wildlife sustainability and how these factors are interwoven also provides valuable information about protected areas such as ANP. These data expose the pressures faced by local people, the strategies they adopt to fulfil their daily protein requirements (such as sharing or selling meat and purchasing groceries) and the implications this has on the local environment and indigenous culture. During the pilot study elders in Mocagua and San Martín suggested that successful hunting required reciprocal relationships inaugurated through negotiation and exchange with other species [**Chapter 3**]. They explained that in the past hunting decisions were made by the shaman through consultations with forest spirits, and that changes in the area meant people now ignore these agreements at the risk of bringing danger, misfortune, illness and unfruitful hunting trips. Similarly, Overing [2003] provides evidence that among the Piaroa the 'giving of disease' is identified with non-reciprocity between hunters and their ancestral spirits. This evidence shows how tradition, beliefs, social structure and people's everyday requirements form a web of interactions with animals on numerous levels.

4.2 Hypotheses

The following hypotheses will be tested to examine the use and categorisation of wildlife among local people in Mocagua and San Martín:

i) Wildlife is valued and categorised in various ways by people from Mocagua and San Martín. Contact with non-indigenous societies adds to the complexity of people's ideas about wildlife.

ii) A web of interactions links the Tikuna to the forest and other species through various beliefs and practices. These are guided by both shamanism and westernised ideas about conservation and the value of wildlife.

iii) Hunting, keeping wild animals as pets, preparing and sharing foods and upholding exchanges with spiritual ancestors (*dueños*) mean people maintain close bonds with nature. As these practices change so too do local attitudes towards wildlife.

4.3 Methods

Participants from Mocagua and San Martín were involved in a number of written and verbal exercises to determine how they valued wildlife. People were asked to write species lists for various use categories, women filled out daily dietary logs and several individuals took part in semi-structured and non-directive interviews. Observations were made in the community and forest when accompanying user groups in their daily activities. These methods are described in detail in **Chapter 2**. Further information is provided below.

4.3.1 Species lists

During workshops participants were arranged in same sex groups, with people of a similar age, to complete written exercises during phase one of the research period (February-May 2008). Participant demographics are provided in **Table 2.2** [**Chapter 2**]**.** Data from women and girls were pooled (5-60+ years) and tested against lists made by men and boys (5-60+ years) to determine the effect of gender on the categorisation of animals. From Mocagua 23% of the population took part, while 27% of people from San Martín participated. This represented 23% of the total population from both communities. Mammals, reptiles, amphibians, birds, insects and fish were listed under six principal 'use' categories that had been previously determined by participants during the pilot study. These categories were identified as: food, pets, tourism, medicine, arts and crafts, and folklore. Informants wrote the names of as many animal species as they could think of for each related category on a sheet of paper. No time limit was set to ensure results were exhaustive of the participants' knowledge.

The lists produced during the workshops included the names of animals and other creatures formerly unrecognised by Western ecology and classification. By referring to publications and through my own previous knowledge some species were confirmed to be anomalies, for example children included 'elephants' as food and 'whales' as pets but this information was assumed to be fictitious. Following discussions with adults and children it was later confirmed that some of the children had written the names of animals they had seen on wildlife documentaries. Where endangered species were included in people's lists the participants explained that although the use of certain animals is prohibited in

ANP and local people no longer hunt them, according to Tikuna belief systems some of these 'absent' species are still powerfully associated with particular traditional practices. It was determined therefore, that people's lists were descriptive of their knowledge and perceptions about animals rather than being representative of current practices in ANP. Species listed in more than one category were assumed to be more important to local people than those animals listed infrequently or not at all, apart from where an alternative explanation was provided.

4.3.2 Dietary data

Information about food choice was collected over a ten month period through daily dietary logs kept by women, through observations in the community during visits to people's homes, during group cooking activities and by means of spontaneous semi-structured or non-directive interviews with groups and individuals. These data were examined alongside species list data on food use [**Appendix VIII**]. Thirty-six women from Mocagua and San Martín aged between 17 and 70 years recorded the food eaten by their families for a total of 274 days, between March 2007 and February 2009. The number of days that these data were recorded in each community varied between research phases due to fluctuating interest in taking part. The first 16 days of data were collected during the pilot study between March and April 2007. These data were acquired during weekly stays with host families to test and validate the methods. During phase one only eight days of data were collected. The majority of dietary data were collected during phase two of the study. For this reason seasonal and temporal dietary patterns could not be recorded.

Dietary comparisons were made between families and communities to explore the impact of hunting quotas [**Chapter 1, Table 1.1**], regulations on food choice and changes in environmental and cultural factors. Disparities between data sets were used to determine how local practices and perceptions about wildlife varied. The frequencies that people consumed different taxa were compared as well as how often they ate domestic, wild or purchased foods. This was to determine the significance of hunting and fishing, the availability of prey and the relevance of commercially produced and domestic foods. The category label 'none' was appointed to meals that did not contain meat or fish. Such meals typically consisted of rice, plantain and some form of starchy root tuber such as yam, yuca

or *fariña*[26]. Protein was occasionally supplemented with pulses, beans or tinned meat and fish bought from the community shop or one of the nearby towns. Women informed me that beans, pulses, tinned meat and tinned fish were all considered secondary to bushmeat and fresh fish. For this reason these foods were included under the umbrella term 'other' during data analysis. Tinned meat and tinned fish were categorised as 'processed' when making comparisons between wild, domestic and purchased foods.

4.3.3 Nomenclature

Appendix IX provides a complete list of animals eaten as 'food' according to the species lists written by participants and the foods recorded in dietary logs during the study. Fish are not included in this list as the majority of these could not be identified at the species level. Animal species are referred to throughout this thesis using the English translation of the most commonly used local name where available. Tikuna names are provided in brackets when referred to as such by local people. Scientific names are taken from Emmons [1999] and used where appropriate, to allow comparisons to be made with other academic studies.

4.3.4 Female participation

To overcome social rules which limit the inclusion of Tikuna women in research a number of data collection methods were specifically designed to be female-led which facilitated their full participation in the project. Data from dietary logs, group cooking sessions, home food preparation and the majority of anecdotal evidence referred to in this chapter were provided by women. This allowed for women's knowledge to be explored and gender comparisons to be made. However, the women gave permission for a few young men who showed a genuine interest in learning from the group to take part in the group cooking activities. Ferguson [cited in Phillips 2006] and Elson [2002] have shown that women were made invisible in many early anthropological studies because of a general bias among male researchers to study scientific knowledge and agricultural economics. The study of food however, brings the role of women into the forefront of research and serves a critical component in their acknowledgement as food distributors, culinary practitioners [Archetti 1997] and principal bearers of traditional knowledge [Mintz 1996].

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[26] *Fariña* is a form of toasted yuca that is crumbled into a crunchy flour-like powder and sprinkled onto food.

4.3.5 Observations and interviews

Observations and informal interviews took place spontaneously in the village. House visits and staying with host families meant I could observe the use of animals directly as well as assist in the preparation of medicines, foods and crafts. People frequently discussed the use of wild animals and their pets with each other and I overheard a number of informative comments and concepts in this way. Many of these triggered further investigation with informants through informal or semi-structured, one-to-one or group interviews. The video camera was occasionally used as a tool to aid further enquiry by summoning the help of a family member as an assistant to record these conversations. The number of pets in Mocagua and San Martín were recorded through all occurrence sampling during the ten month research period. When a pet was observed in somebody's home or an informant told me about an animal they had newly acquired it was added to the data set. The name of the community where the observation took place and details about the informant (age and gender) are provided where relevant. Participants are named only where requested by the informant, otherwise these data remain anonymous. To establish whether the information was acquired at the start or towards the end of the study the year is also included, as this influenced the type of information I had access to; people were more wiling to share their ideas as the study progressed and they became better acquainted with me. Where the full date is provided this refers to a diary entry.

4.3.6 Limitations to methods

4.3.6.1 Language and nomenclature

As previously established, language and naming play a significant role in conveying meaning to objects, people, places and things. Therefore, the language used by a researcher in the field can either add to or detract from their appreciation of local beliefs and culture. While it is acknowledged that referring to animals by their Spanish names in this study contravened Tikuna concepts of nature, because of limited time in the field it was not possible to learn Tikuna to a level that enabled analysis to take place in the traditional language. Furthermore, Tikuna remains an unwritten language which meant I was unable to study the language in the UK before heading to the field. This mattered less in Mocagua than it did in San Martín as very few people in Mocagua speak Tikuna but instead

have chosen Spanish as their first language. Where folkstories were recited in Tikuna by older participants they were filmed using a video recorder and later translated into Spanish with a local assistant. As mentioned in **Chapter 2** a local translator also assisted during conversations with those who spoke only Tikuna.

4.3.6.2 Labelling and categories

Cross-cultural disparities associated with how local people identify animals were amongst other important findings revealed during the study. During workshop activities where participants were asked to write a list of animals they considered to make good pets people did not distinguish between pets they cared for inside the home, livestock which were generally kept outside and reared for food, and swarms of insects that infested the house. Further enquiry revealed that this was because of misunderstandings over the category labelled as 'pets' between myself and the participants. Local people explained to me that their understanding of the Spanish word for pet (*'mascota'*) is *'animales en casa'* which literally translates into "*animals in the house*". This was taken to mean any creature found in the home irrelevant of their relationship with their human counterparts. It somewhat contradicts the English meaning of the word 'pet', which is defined in the Oxford English Dictionary as; "*[A]ny domesticated or tamed animal that is kept as a companion and cared for affectionately*" [Concise Oxford English Dictionary: eleventh edition, revised 2009], and is a reminder of the discrepancies between different peoples understandings of human-nature interactions. Furthermore it demonstrates the significance of the domestication process through the treatment and residency of objects and things in Amerindian culture [Rival 2012] and shows how important the labelling of animals associated to their identification and their role in society is among the Tikuna.

The twinning of data collected through workshop activities and direct observations revealed further discrepancies in the naming and identification of species. For example, both the kinkajou (*Potus flavus)* and the more commonly recognised Colombian night monkey (*Aotus spp.*) were referred to as '*mico nocturno*' meaning 'night monkey'. This caused some confusion until further clarification had been carried out by talking to informants about which night monkey they were referring to. Discussions with elders about traditional animal classification systems also provided valuable insights into these definitions [**Chapter 5**]**.** In addition certain

species that were seen being eaten in people's homes did not appear in the completed dietary logs. This is because some participants chose to shield the identification of 'taboo' species[27] by changing the name or omitting them from their dietary logs. Despite confidentiality agreements made with communities before the research began, my previous involvement as a conservation researcher in ANP, along with the contact that all visiting researchers must maintain with the UAESPNN somewhat influenced the information that people felt comfortable sharing with me. People's decisions to withhold information from their dietary logs revealed insight into existing tensions between the local communities and other stakeholders in ANP, and acted as a reminder about the importance of adhering to agreements made with local people over their free will to participate in research.

4.3.6.3 Participation

The number of species recorded in people's diets tailed off with sample size. This suggests data saturation was reached and a sufficient sample size observed to ensure a truthful representation of the local diet in ANP [Glaser and Strauss 1967]. Quantitative data gleaned from the dietary logs which the women in Mocagua and San Martín recorded form an integral component of these data, however the degree to which the women could participate in the research was determined by a number of factors. These were:

i) The ease with which women could use the weighing scales. Individuals who found the scales time-consuming and difficult to read soon opted out of the research.

ii) The amount of time women could contribute to the study. Women who worked in the ANP tourist lodge and restaurant had less time to record and weigh food as they often returned home from work late at night.

iii) The interest that women showed in the research. Women who expressed a vested interest in the study and wanted to understand the nutritional quality of their families diet took part in the project for a longer period than those women who were involved in the study for different reasons.

iv) How much the women enjoyed the research activities. Most women said they enjoyed the communal cooking sessions as it gave them an opportunity to meet with their female family and friends and socialise away from home.

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[27] Taboo species include those animals protected by hunting quotas and cultural norms, both of which establish regulations about what may and may not be killed, eaten or cared for.

4.4 Results

4.4.1 Species lists and categorisation

Local people from Mocagua and San Martín wrote lists of the animals they associated with the categories: food, pets, tourism, medicine, arts and crafts, and folklore to determine how they use and categorise animals [**Chapter 2**, **section 2.4.3**]. Informants named 183 animal species spanning 59 orders [**Appendix VIII**]. The number of species named for each category varied significantly and several species appeared in multiple categories (χ^2=411.7, n=971, df=5, p<0.05). It is assumed that categories with the longest lists reflect those activities which are most reliant on wildlife for their application, although other publications suggest certain practices require few specific species for their specialised use [Cristancho and Vining 2004]. This will be further examined in **section 4.4.3.2**. Animals were most commonly categorised as food (67%) and as pets (59%). There is a 32% overlap between these two groups which indicates some connection between hunting and pet-keeping. For example, primates, deer, black agouti and birds, among others appeared in both. The numbers of wild and domestic species named in the six category lists differed considerably from each other. Where wild animals were named across all six categories, domestic species appeared only in the categories 'food' and 'pets'. Observations in the community support these data. Most families were seen keeping dogs which they took hunting, and some people reared ducks and chickens for eggs, and kept pigs for meat. Data on pet-keeping is analysed in **section 4.4.5.** As explained previously those species called 'pets' usually also included animals being reared for meat, as well as insects such as cockroaches and ants, because of discrepancies over the meaning of the category heading 'pets'.

4.4.2 Culturally key species

Certain animals appeared more frequently than others in the lists generated by participants. These are identified as being culturally key for various reasons. The tapir (*Tapirus terrestris*) was most frequently listed (n=31) and included in five out of the six categories [underlined in **Appendix VIII**]. Tapir meat is highly prized by local people, its body parts are used in medicines and crafts, it is popular with tourists and researchers and is associated with a number of Tikuna folkstories. One hunter from Mocagua commented; "*The tapir has the best sounding skin for*

drum-making" [G. Cayetano, 41 years of age, Mocagua]. When asked 45% of participants said tapir was their favourite meat (n=124). During group discussions a number of people said the animal was a powerful and dangerous animal, and for this reason not deemed a suitable pet. The yellow-footed tortoise (*G. denticula*) appeared across all six categories, as did the woolly monkey (*L. lagothrica*) [also underlined in **Appendix VIII**]. During the study, tortoise shells were observed around the community being used as bowls and seats, as well as forming the central piece of a traditional instrument used during the *Pelazón*. Although the *Pelazón* now only takes place in San Martín the instrument was seen in the households of two elderly people in both communities. Furthermore, local people placed exceptional importance on the woolly monkey as a species for research, tourism, and meat, even though there is a ban on its consumption. It was also considered a popular pet, especially among children who described infants as being "*cute, cuddly and funny*".

4.4.3 The multiple use of animal parts

Observations in the community and the way people spoke about wildlife suggest local people in Mocagua and San Martín engage with and use wild and domestic animals in a multitude of ways. After an animal was hunted for meat I regularly observed its byproducts being used in traditional medicines and to make utensils or crafts. For example sloth bladders were preserved and used as a traditional cure for bed-wetting, by hanging them above the beds of young children. Sloths are renowned for storing high volumes of urine over long periods (up to a month at a time), an evolutionary adaptation which increases the concealment of the animal to predators when it is resting at an elevated height in the forest canopy [Britton 1942]. Quantitative data acquired through workshop activities support these observations. Species lists show that 13% of those animals named as food were also used in crafts and medicines. Indeed the multiple uses of animal parts were discussed by participants in workshops and during group cooking sessions and information gathered on the detailed use of 34 wild animal species. These data are listed in **Appendix X**.

4.4.3.1 Traditional medicines

A number of animal species were known to make effective medicines by local people when processed and administered in the correct way. For example, ants and snails were said to provide a cure for sickness, moles, spots and coughs when boiled in tea. An older women explained; "*Insects and small creatures can cure you when you are sick because they never get ill*" [J. Cayetano, 70 years of age, Mocagua]. While most insects and smaller creatures were considered low value food items, the Palm Weevil (*Rynchophorus spp.*) or *mojojoy* grub was an exception to the rule. It was frequently referred to as an esteemed sacred food with high nutritional value. Equally, the body parts of larger mammals such as tapirs, jaguars and woolly monkeys were said to transfer certain qualities to people, either when ingested or kept in close proximity. The species lists generated by participants also showed that 20% of named reptiles are used by local people in traditional medicines. For example, the fat from the anaconda (*Boidae Family*) and the caiman (*Caiman sp.*) can be used to cure fractures and bronchitis, and feathers, teeth, claws, shells and porcupine spines are mainly used by women to make artisan crafts. Women highlighted the importance of using these resources in necklaces and earrings which are sold to tourists and used during the *Pelazón.* Animal bones and pelts were observed being used to make implements in the home. These included fire bellows made from deer skin, hooks carved out of deer bones and musical instruments such as drums and whistles fashioned from tapir and monkey skin and bones.

4.4.3.2 Specific uses

Despite the broad spectrum of wildlife recognised by the Tikuna and the diverse ways in which some species were categorised by local people, certain animals were identified as being used for highly specific purposes. For example women made distinctions between the types of birds that are eaten, those which are kept as pets and those used in crafts. They explained that while feathers from the red-throated caracara *(Daptrius americanus)* are woven into traditional costumes worn by young women during the *Pelazón*, the plumage of parrots, toucans and other small birds are used for everyday crafts such as necklaces and earrings. Furthermore, while small birds or 'true parrots' (*Pscittidae* Family) and macaws (*Ara spp*.) are kept as pets, domestic chickens, turkeys and ducks are reared for meat [underlined in **Appendix VIII**]. Despite a consensus that small birds are not

typically eaten, a few older women admitted having eaten parrots in the past (3%, n=10).

Aquatic mammals such as manatees and dolphins were identified as having medicinal properties as well as being associated with folklore. For example, the folkloric figure of the pink river dolphin (*Inia geoffrensis*) or '*boto'* is said to be highly sexual and a danger to young women who bathe alone in the river. This belief provides fodder for speculation that the dolphin's anatomy improves fertility among men and its penis can be used to cure impotency. Local people also admitted that the use of this medicine is no longer permitted in ANP because dolphins are now a conservation priority and an important asset for tourism. Indeed, through further conversations it was determined that neither dolphins nor manatees are eaten in either community because of on-the-ground conservation efforts which do not permit these practices. The pink river dolphin is also perceived as being connected to powerful water spirits which preclude it from being harmed or killed, while the manatee is extremely rare and difficult to locate. Both these factors contribute to these species' conservation.

4.4.3.3 Daily practices

The different roles that men and women fulfill in their communities appears to have influenced the species lists they wrote during workshops. While the total number of species named by men and women were similar overall (χ^2=9.23 df=5, n=642, p>0.05), when the number of species named for each category was compared, women wrote significantly longer lists for food (χ^2=6, df=1, n=105, p<0.05) and for pets (χ^2=32, df=1, n=75, p<0.05) than did men. This is assumed to be because of the extensive time women spend preparing food and caring for animals. Furthermore, a Kruskal–Wallis test, corrected for tied-ranks, indicates a significant difference between the length of species lists when comparisons are made between the data generated by men, women, girls and boys (H=6.085, df=3, p<0.05). Pair-wise comparisons between the number of species named by each sample group show that men and boys provided similar answers when compared at the taxa level (men and boys: χ^2=6.24 df=5, n=362, p>0.05) however those provided by their female counterparts were dissimilar (women and girls: χ^2=54.22 df=5, n=603, p<0.05). These data also show a significant difference between the lengths of the lists written by boys and by girls (χ^2=19.41, df=5, n=323, p<0.05).

This suggests that knowledge is not being passed down to children from women, whereas boys still have opportunities to learn from their fathers. These results are presented in **Fig. 4.1** and will be further explored in **Chapter 5**.

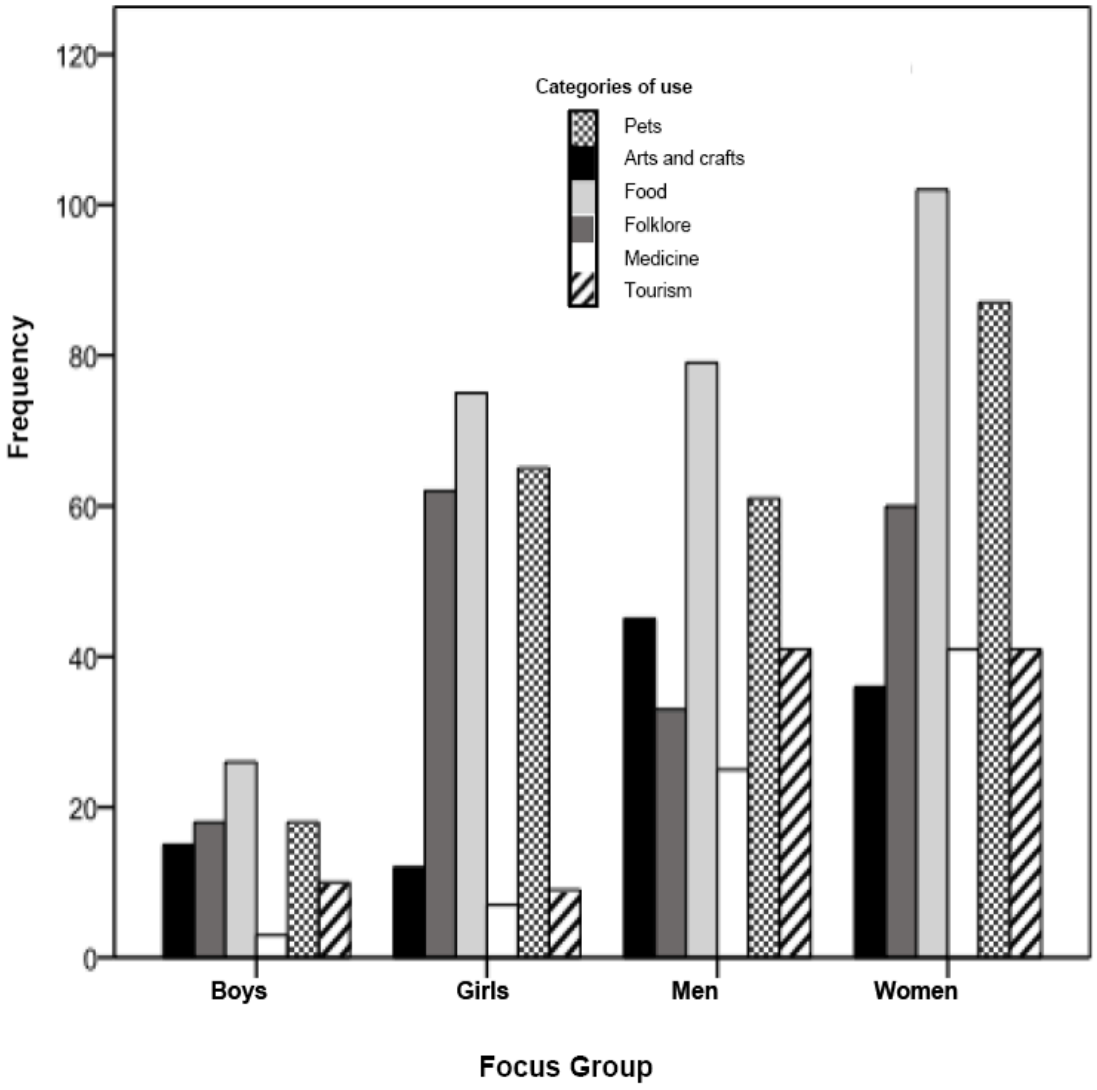

Figure 4.1 Number of animal species named for six reference categories by adults and children during workshops in Mocagua and San Martín in ANP, Colombian Amazon

4.4.4 Commodification of wildlife

While the value of wildlife for money was frequently discussed as an important factor among local people during the study the only evidence of people trading wild animals for financial purposes was through the small-scale production of artisan crafts and the local sale of bushmeat. Indeed selling meat to other members of the community appears to be a major economic activity in Mocagua and San Martín. The provisioning of meat to the local Catholic boarding school in Puerto Nariño is also used to cover the costs of a substantial portion of children's school fees for some families [Male participant, 42 years of age, San Martín]. Exact figures on the sale of bushmeat could not be obtained however as people chose to be discrete about this activity due to restrictions put in place by the UAESPNN.

4.4.4.1 Tourism

Wildlife is valued for its role in tourism by a number of people in Mocagua and San Martín and this is having a marked effect on how children view wildlife. For example the following dialogue was recorded when children in Mocagua were asked which animals they believed to be important and why [n=5, 7-11 years]:

[Girl 1] *"The dolphin is very important for tourists as they really love the ambience of the Amazon. The dolphins are found in the Lake Tarapota and in the river and in Vistalegre. They are pink, grey and black. They are very pretty."*

[Girl 2] *Some tourists like the anaconda, some don't. The morocoy [turtle] has lots of characteristics that are pretty as they have many colours and the tourists really like them.*

[Researcher] *"So why else is the morocoy important?*

[Girl 1] *"For visitors."*

[Researcher] *And can you explain why you don't like the fox?*

[Girl 3] *"The tourists don't like them."*

[Boy 1] *"Jaguars, monkeys, dolphins, parrots and caiman are important animals. The monkey and dolphin are most important as everyone from outside of the community likes them and you can do demonstrations with them. Rabbits are not important as the tourists have them in their countries too*."

This evidence demonstrates how some species clearly take precedence over others when it comes to their value for tourism as far as local people are concerned, and this creates a number of setbacks for biodiversity conservation.

4.4.5 Animals as food and pets

The number and species of animals cared for in people's homes and the different types of meat eaten during meal times were compared with the species lists generated during workshops. This allowed data on hunting, fishing and pet-keeping to be examined, as well as how these activities influence the ways in which people in Mocagua and San Martín categorise wildlife.

4.4.5.1 Pet-keeping

Despite the variety of pets named during workshops my observations suggest that wild animal pet-keeping is no longer common practice in either Mocagua or San Martín. A total of 82 pets were observed during walks, household visits and time spent with host families [given in bold in **Table 4.1**] but people more commonly cared for dogs (43%, n=82) and livestock than they did wild animals. Indeed, when the frequency of observations for wild pets and for domestic animals are compared there is a significant difference between the two (χ^2= 21.5 df=1, n=82, p<0.05). Domestic animals account for 82% of all observations whereas wild species account for only 18%, and wild pets were more commonly kept in San Martín than they were in Mocagua (17% and 5% respectively). Pets were typically cared for by women and children which attributed to their knowledge and perceptions of pet animals. This became evident when the length of the species lists for pets were compared, and women were found to have written significantly longer lists compared to men [**section 4.4.3.3**].

Sloths, deer, tamarins, various birds including a woodpecker and an owl, insects and tortoises were kept as pets during the study. Most of these were acquired as infants by their owners and few lived longer than 2-3 months. When the types of pets in each household were compared some older women showed a preference for keeping parrots and small birds (70%, n=5). As mentioned in **section 4.4.1** a number of families kept chickens and ducks for their eggs and meat (12%, n=27). Several domestic species, including goats and turkeys, were kept in Mocagua but not in San Martín because of differences in families' economic wealth [underlined in **Table 4.1**]. One family in Mocagua had fifteen pets each with their own nesting box. When interviewed they told me; "*We love all animals and want to have them in our home with us. I make each of them a place to sleep and give them plenty of food. They are part of our family*" [M. Cayetano, female, 40 years].

Table 4.1 Number of observations of wild and domestic pets in Mocagua and San Martín over a ten-month period in the Colombian Amazon [underlining indicates data referred to in text]

	Mocagua	San Martín	Total
Wild pets	4	14	18
Domestic pets	36	28	64
Total	40	42	82

4.4.5.2 Dietary logs

The women in Mocagua and San Martín recorded an entry in their dietary logs every time they cooked a meal for their families to document which animals they were eating at home [**Chapter 2, section 2.4.7.1**]. Percentage values were calculated for each species by dividing the number of meals containing each type of animal by the total number of meals eaten. Information on family size and the amount of data each household contributed is given below in order to contextualise data sets [**Table 4.2**]. Although a higher number of families from San Martín took part more data were recorded in Mocagua (497 meals in Mocagua compared to 325 meals in San Martín). Each family who participated from Mocagua provided approximately seven weeks worth of data, averaging more than 50 meals per home. By comparison in San Martín record-keeping was allocated to three times as many people with each family logging their meals for approximately one week. Family size was similar in both communities with a median of five individuals per household in San Martín and six in Mocagua [**Table 4.2**].

Table 4.2 Amount of dietary data recorded by families from Mocagua and San Martín in the Colombian Amazon over a ten-month period, with median and range values for family size

Community	No. of families	Median no. of meals and range values	Median family size and range values
San Martín	28	8.5 (1-46)	5 (1-12)
Mocagua	8	51.5 (1-198)	6 (2-10)

Women were given scales to weigh the amount of meat and fish they cooked for each meal but as previously mentioned a number of women had problems using the scales. This meant insufficient observations were acquired to make comparisons using weighed amounts alone so these data were pooled with data from dietary logs.

4.4.5.3 Meal composition

Data were broken down into taxa (fish, mammals, birds, reptiles and insects) to examine meal composition and identify which animals were most frequently eaten by families in Mocagua and San Martín. Only one recorded event of amphibians being eaten was made during the study, therefore amphibians were not included in the analysis so as not to place inappropriate emphasis on them as a food. Instead this datum was included in the category 'other' which also comprised of tinned meat and fish. A rare toad known as the '*sapo galo/walo*' (believed to be of the Bufonidae Family) was captured and prepared by an older woman from San Martín, who said; "*They [sapo walo] are not eaten any more, as people don't know how to catch them! You must be silent, sitting close to where they sleep and wait patiently. You have to wait and wait until he comes out of his hole and then 'pack!' He can be hit on the head and taken to cook on the fire!*" [M. Vasquez, 70 years of age, San Martín, June 2009]. Frozen chickens were grouped with 'birds' on the premise that this meat is nutritionally comparable to fresh poultry whereas the processed food sold in tins is not.

The percentage frequency that meat and fish were consumed in Mocagua and San Martín was calculated by dividing the number of meals containing meat and then fish from the total number of meals recorded by participating households in each community. This showed a significant difference between the types of foods eaten by people in both communities (Mocagua: χ^2=815.4, n=191, df=5, p<0.05 and San Martín: χ^2=845.6, n=77, df=5, p<0.05). Differences were also observed between the diets of local people from the two communities. In Mocagua and San Martín fish was consumed most frequently followed by mammals then birds [values underlined in **Table 4.3**] however people in San Martín ate the latter two food groups less often than did people in Mocagua. In San Martín families also collected and prepared the culturally important *mojojoy* beetle larvae several times however this process was carried out only once during the study period in Mocagua. People rarely went without meat and fish during the study period (less than 4% of the time in both communities). Similarly, 'other' foods such as beans or tinned tuna were infrequently bought as a substitute to replace (wild and domestic) fresh protein [shown in italics in **Table 4.3**].

It is expected that diet varies throughout the year in Mocagua and San Martín because of seasonal variations in species abundance, however incomplete annual data meant that seasonal comparisons could not be made. A naturally occurring increase in fish stocks in the river in July makes it likely that more fish is consumed during this period. From the middle of July until the beginning of August water levels begin to decrease until they reach their lowest level at the end of August. The weather is comparatively drier compared with April and May which are the wettest months. Again this will affect which resources are available to people [Patiño Gutiérrez 2011].

In ANP, when the water reaches its lowest level boats cannot go beyond a certain point and access to Mocagua Island and parts of the forest is restricted. Some of the most striking climatic and seasonal fluctuations occurring in the Amazon are caused by '*El Niño*' (a phase of the 'El Niño Southern Oscillation'). It is defined by prolonged warming in the Pacific Ocean and a dramatic rise in water levels, which results in a period of intense rainfall and often leads to flooding. During this period there is an abundance of fish, however *El Niño* is known for its potentially catastrophic impact on the weather which makes navigating the river a difficult and dangerous task. *El Niño* is followed by a period of '*La Niña'*, when the sea surface temperature across the equatorial Eastern Central Pacific Ocean is lower than normal by 3–5 °C. This latter phase creates unusually low water levels which often lead to droughts and illness. Typically, this anomaly happens at irregular intervals of 2-7 years, and can last any time from between nine months to two years [*ibid*.].

Table 4.3 Percentages of meals containing different animal taxa in Mocagua and San Martín over a ten-month period, calculated from the total number of meals consumed in both communities [underlining indicates taxa most commonly eaten. Meals without meat or fish are shown in Italic]

	Fish %	Mammal %	Bird %	Reptile %	Insect %	Other %	None %	Total %
Mocagua	64	22	10	0.2	0.2	1	*2*	60
San Martín	73	16	3	0.3	1	3	*4*	40
Total	68	20	7	0.2	0.6	*2*	*3*	100

4.4.5.4 Species variety

Fish were not only the most frequently consumed food during the study period but also represented the widest variety of taxonomic groups eaten by local people. Twenty-seven types of fish were listed in dietary records, and many of these (48%) appeared less than twice. These data indicate considerable diversity among fish in the Amazon. The most commonly consumed fish species were sabaló (*Brycon spp.)*(11%), sardines (*Sardina sp.)* (8.5%) and palometa (*Pygocentrus palometa)* (7.1%) [underlined in **Appendix XI**]. Mammals and birds constituted a moderate portion of the local diet after fish (27% of recorded meals). Data suggest a more diverse variety of mammals were eaten in San Martín during the study period than were consumed in Mocagua, although the higher number of families who participated in the research in San Martín may have influenced these results. Systematic comparisons between the communities are made in **Chapter 6**.

Fourteen different mammal species were named in the dietary logs recorded by local people, however the identity of 21 entries (13%) were undisclosed by participants and written as '*carne*' (meaning 'meat'). Five of these entries (3%) were identified as unnamed primate species [shown as bold in **Appendix XII**]. The night monkey appeared only once, but as previously mentioned it was not always clear if participants were referring to *Aotus spp*. or *P. flavus,* and so there was some uncertainty as to the correct identity of this species. That said, the small body-size and nocturnal habits of *Aotus spp*. make it cryptic and difficult to detect in the forest determining it unlikely prey. Indeed meat from *Aotus spp.* was not observed being cooked or eaten during the study however meat from *P. flavus* was. Following further enquiry elders confirmed that the "white-chested" night monkey can be eaten whereas the "red-chested" night monkey or '*buri buri*' is a

dangerous forest spirit which cannot be killed [details in **Chapter 5**]. Bushmeat was the most commonly eaten meat during the study, constituting 82% of the meat recorded in dietary logs. Those species most frequently consumed included: black agouti (*Dasyprocta fuliginosa*), tapir (*T. terrestris),* deer (*Mazama spp.*), nine-banded armadillo (Dasypus novemcinctus), paca (*Agouti paca*) and white-lipped peccary (*Tayassu peccari*) [underlined in **Appendix XIII**]. Domestic mammals were eaten infrequently by comparison (just 6% of meals containing meat). In Mocagua these data included pigs and cows. As cattle are kept in neither community however, it is assumed that beef was bought from elsewhere.

Ninety percent of the birds recorded in the dietary logs were domestic species [underlined in **Appendix XIII**]. Chickens and ducks were the only domestic poultry named although turkeys were reared in some people's homes (3%, n=27). One informant explained this was because turkeys are fattened and saved for Christmas and Easter[28] [Male participant, 42 years of age, Mocagua]. Only four wild bird species appeared in the dietary logs. These were the curassows (*Crax spp.*), hoatzin (*Opisthocomus hoazin),* wattled guan *(Aburria aburri)* and birds from the Columbidae Family [**Appendix XIII**]. While parrots were named as food items by some of the older women [**section 4.4.3.2**] they do not appear in dietary logs suggesting a change in the local diet has occurred over time. A number of reptiles were named by participants as food in their species lists during workshops but only three reptilian taxa were recorded in dietary logs. The caiman (*Caiman crocodilus*) and 'matamata' turtle (*Chelus fimbrata*) were both eaten twice during the study period and the Tegu lizard *(Tupinambis teguixin)* was killed and eaten during a group cooking event. The *mojojoy* palm weevil was the only insect eaten by local participants. The significance of this grub is discussed in **section 4.5.2.1**.

4.4.5.5 Wild, domestic and bought foods

To examine the role that traditional practices play in determining the diets of local people in Mocagua and San Martín I assessed whether meat was hunted, reared in the community or bought from elsewhere. Similarly, where people ate fish I recorded if the fish was locally caught or if it had been purchased from outside the community. Data from dietary logs were categorised as wild (bushmeat or wild

[28]Like most of Colombia's population many people from the communities of Mocagua and San Martín celebrate Catholic holidays and festivities alongside their indigenous rituals and ceremonies.

fish), domestic (locally reared livestock or poultry) and bought (tinned meat and fish or domestic meat and poultry bought outside the community). These data show a significant difference between the amount of wild, domestic and bought foods that were consumed by the participating families (χ^2=22.63, n=733, df=2 , p<0.05); the majority of foods were wild caught (88% of meals) while a small number were sourced from the shops or outside of ANP (5%).

As previously suggested domestic meat was eaten significantly more frequently in Mocagua than it was in San Martín (12% and 2% respectively) but these values are still low when compared to the amount of wild sourced protein eaten in the communities [values underlined in **Appendix XIV**]. Domestic meat and fish were not typically eaten in the same meal as wild meat and fish which supports the assumption that these foods are sought out when there is a shortage of wild supplies, or if people do not have time to go hunting and fishing. Contrary to this notion a Spearman Rank Correlation (corrected for tied ranks) showed that those families who ate more wild animals also consumed more domestic meat (Spearman rank correlation: r_s=0.80, n=24, p<0.05).

4.5 Discussion

4.5.1 Categorising wildlife and human-animal associations

Hypothesis one proposed that animals would be categorised in different ways by participants from Mocagua and San Martín during written tasks, and that practices and ideas introduced through contact with non-indigenous societies generate new ideas that change the way local people perceive and interact with wildlife. Indeed, the data show that wildlife is important nutritionally, culturally, socially and economically to local people. A variety of animal parts are used in arts and crafts, traditional medicines and eaten as food whilst the young of wild animals are affectionately cared for as pets. Some animals are believed to possess powers and traits as conveyed through folkstories, while others are recognised as being valuable for tourism or because they provide jobs in conservation and research. These data also show the ways in which animals are categorised by local people is indicative of their cultural perceptions of wildlife.

As expected while some animals were identified by participants as being paramount to traditional practices and cultural beliefs, others were noted for their functional uses. Differences between wild and domestic species were particularly evident. Data showed that wild animals filled multiple roles in Mocagua and San Martín while domestic species were kept mainly for food and as pets. Moreover, I observed a difference in the way that wild and domestic species were tended in the communities. Wild animals were often brought into the home and treated with care and affection, their owners taking time to find suitable foods to feed to them and nursing young animals by hand. By comparison to the demonstrative care directed at wild animals I saw dogs frequently being mistreated and starved. One hunter told me that dogs serve a working role and are kept hungry so that they follow the scent of prey; "*My dogs must not be fed too much or they will not look for prey when we go to the forest*" [G. Cayetano, 41 years of age, Mocagua, August 2007]. Apart from dogs, most other domestic animals were often well fed but kept outside and hardly ever allowed into the house. While livestock and other domestic animals are valued for the work, food and money they provide, wild animals become part of the family. These behaviours support theories that suggest the forest (and all things from it) acts as a social space where humans and animals interact as equals [Rival 1997].

4.5.1.1 Wild pets

Caring for wild animals is widespread among a number of indigenous peoples. Indeed pet-keeping is the most commonly recognised practice that links humans to animals worldwide [Erikson 2000]. Although relatively few observations of wild animal pet-keeping were made during the study participants were seen caring affectionately for their wild pets, and I observed several reasons for this. A number of parents from Mocagua and San Martín said that pets taught their children to be responsible and encouraged a caring attitude towards other beings. For example one mother explained; "*I would like to get my son a pet so he learns to look after things*" [Female participant, June 2007]. Aside from an educational and social function, wild pets are seen as serving a protective role to local people, and acting as mediators with forest spirits. For example, birds are believed to convey messages between people and the spirit world. This means the addition of bird feathers is an integral part of many artifacts and adornments created by Tikuna women [detailed in **Chapter 5**]. Hunters from Mocagua and San Martín added to this that young animals must be cared for when prey is killed to recompense the animal's death; the prey's young is fed and nurtured in order to appease it's *dueño* or spiritual guardian. One informant explained; "*Adopting wild animals as household pets ensures the animal is safe after its mother has been killed and this makes the dueño content"* [Hunter, 32 years of age, San Martín].

Basso [1977] proposed that for many Amazonian societies taking care of wild animals provides refuge to their human owners and guarantees hunting success. Other studies suggest close interactions with wild animals in the home yield opportunities for children in hunting societies to familiarise themselves with prey and learn basic ethology about wildlife [Fuentes 2006; Cormier 2003]. De Castro [2004a] reports that the Yawalapiti use birds to assist travellers to the sky in exchange for the care they received on earth, while Monod [1972] reported that Piaroa women said their pet parrots sang away disease in compensation for food. Similarly Reichel-Dolmatoff [1968] described how the Desana considered their wild pets to provide them with immunity towards illness. Indeed, some groups of peoples believe that even in death certain pets serve a protective role to their human masters e.g. monkeys for the Marubo [Melatti and Melatti 1975] and coatis for the Ache [Clastres 1972].

One explanation for the low number of wild pets in Mocagua and San Martín may be that fewer people hunt than they did before. However Erikson [2000] suggests the number of wild pets kept in the communities is not necessarily representative of peoples attitudes towards wild animals; "*The deed of keeping wild animals as pets is far more significant than the frequency with which it occurs*". Furthermore, despite the many perceived benefits accumulated by local people by caring for wild pets, regulations imposed by the National Park place limitations on this practice. Whilst wild animal pet-keeping is recognised as an important cultural practice for the Tikuna by the UAESPNN, specifications are outlined that stipulate which animals may and may not be kept in the home. This creates mixed views among local people and is the cause of tension between community members and ANP authorities. For example, while monkeys were identified as popular pets by some participants during workshops other people were opposed to the idea [Male and female participants (n=24), 7-56 years of age, June 2007-June 2009]. 'The Animal House' is a long-term conservation project in ANP which has been instrumental in changing people's minds about keeping monkeys as pets [details of this project are given in **Chapter 1**, **section 1.5.7**].

4.5.1.2 Defining boundaries between food and pets

While there is an obvious crossover between pets and prey species in Mocagua and San Martín structures are in place that dictate which animals are suited to these roles. These are established in the way hunting practices are carried out, how animals are treated, and more specifically the spaces they occupy in the community and forest. Participants explained that wild animals transform their identity according to their location and owner. When a wild animal passes from the forest to the community it undergoes a physical transformation so that it can enter into the human realm; "*All animals and plants in the forest have a 'dueño'*[29]*. When an animal is taken to the village as a pet or as prey we become its owner*" [Male participant, 38 years of age Mocagua]. Other studies have shown that the identity given to pets through naming allows them to minimise their resemblance to their wild counterparts [Grenand 1980; Reichel-Dolmatoff 1968].

[29] Spiritual guardian or 'owner'

The standard of establishing distinctions between food and pets is not specific to Amerindian societies but a cultural norm observed cross-culturally. Corrall [2002] reports that in South Korea dogs sold as meat are given a separate name and identity to puppies on sale as pets; "*Yellow dogs or 'nureongi' are sold from black cages as food, in the same street markets that display small, 'fluffy' pet breeds in pink cages"*. Corrall [2002] suggests that while Korean's would not consider eating their pet dogs, *'nureongi' or* dog meat remains a popular and auspicious food, eaten by local people of all ages. Evidence shows that the parameters which discern pets from food also sometimes extend to the secondary use of their body parts. For example, Wilbert [1972] reported that the Maquitare of Brazil use the feathers of pet birds in crafts, whilst plumage plucked from hunted individuals of the same species are discarded on the forest floor to guarantee the continued reproduction of wildlife.

4.5.1.3 Pet choice

Just as criteria distinguish the roles of domestic and wild animals in Mocagua and San Martín, measures exist which prescribe which animals make suitable pets. Monkeys, birds and infant sloths were often talked about by participants as being preferred pets while other species were considered cause for trepidation and outside of human jurisdiction. For example, although the tapir (*T. terrestris*) is a popular prey, hunters maintained that their infants must not be brought into the home as the animal is associated with malevolent spiritual beings which prevent it from adapting to the human realm. It is said that the painted tapir, '*imi imi*', seeks revenge if a tapir infant is taken from the forest and these beliefs mean that special precautions are adhered to when hunting tapir; *"Once you have killed a tapir you must remove its tongue so it cannot tell its mother ['imi imi']. It is very dangerous to take a youngster because she ['imi imi'] will come to fetch her young and punish you*" [Hunter, 65 years of age, San Martín].

Akin to the tapir, dangerous forest guardians frequent mineral licks and take the form of '*imi imi'* (the painted tapir) or the '*jacaroona'* (the water spirit which appears as an anaconda) [**Chapter 5**]. Indeed, tradition tells that it is forbidden to hunt animals at mineral licks for fear of '*imi imi'* causing them to dry out in retribution. To minimise these dangers certain practices can be carried out before hunting trips take place. For example, some hunters eat large amounts of hot peppers or chilies

before entering the forest to "*burn the eyes*" of dangerous animals. The Tikuna also associate the anaconda with malign powers due to its prevalence at mineral licks. Indeed, it is through fear of the '*jacaroona'* that a number of parents in San Martín did not permit their children to bathe alone in a local watering hole [observed between May 2008 and June 2009]. Similar stipulations have been reported among other Amazonian societies. Favourite pets among the Mtases and the Txicao are sloths and capybaras, the Gaia show a preference for monkeys and the Aché adopt coatis into their homes [Erikson 2000], whilst Rival proposed in her 1998 publication that, "*The Huaorani of Ecuador socialise only with 'civilised' animals and brutally hunt those species considered treacherous or savage*".

4.5.1.4 Culturally important species

The tapir was identified as being culturally key because of its presence at mineral licks and its popularity as prey due to its size and taste. Other species distinguished as being central to Tikuna culture were the tortoise and the woolly monkey. Both are ascribed purpose in Tikuna ceremonies. Similar to the tapir, the woolly monkey is also considered a highly-prized source of meat. Smoked woolly monkey meat was seen being shared between elderly members of the community on one occasion during a *Pelazón* ceremony in San Martín. As slow conspicuous animals, tortoises are hunted easily and their decorative shells are used in a number of crafts. Although tortoise meat was not recorded in dietary logs people spoke about eating it and several shells were seen in people's homes. This confirms previous hunts had taken place and suggests that the current population density of the species may have been considerably lowered. Both woolly monkeys and tortoises were talked about as being popular pets although there was no evidence that woolly monkeys were kept in either community any longer. This is largely due to the animal being hailed a charismatic flagship species which draws tourists and researchers to the region. Besides their value in Tikuna culture the woolly monkey and tapir are both principal species of long-term conservation concern. Quotas are implemented by ANP to limit the number of tapir hunted [**Chapter 1, Table 1.1**] and a ban is in place which condemns the hunting of woolly monkeys in Mocagua's territory [Maldonado 2012]. While some people adhere to these regulations others continue to hunt tapirs and primates because of cultural and social factors which they feel outweigh conservation ethics [Male participant, May 2009]. These ideas are further examined in **Chapter 6**.

4.5.2 The multiple roles of animals

My observations in Mocagua and San Martín supported the suggestion that human-wildlife interactions are multifarious. Data collected when observing complex food preparation techniques, conversations held with people in the community about the use of wildlife and the species lists generated during written exercises all contributed to these findings. For example, most animals were named in two or more of the six reference categories (food, pets, medicine, arts and crafts, tourism and folklore) during written tasks. True parrots (*Pscittidae* Family) and macaws (*Ara spp*.) were identified as pets and their feathers were used in arts and crafts. Deer meat was eaten, their skin used to make drums and bellows, and their hooves and horns used for decoration. Dolphins and monkeys were both said to be important for tourism and associated with folktales that established powerful human-animal connections. Furthermore, when women prepared meat they removed, washed and preserved each part of the animal's body for later use. These processes were described in detail by the women. Among other things, informants discussed how the throat sac of the howler monkey *(Alouatta seniculus)* is used to cure laryngitis, crushed animal's teeth can be rubbed into the gums of older people to stop tooth loss, and lizards' tongues are reputedly effective at silencing children with a tendency to talk too much [Elderly participants, May 2009]. Some meals were prepared specifically to teach other people in the communities skills which were unknown by the majority. For example, a Tegu lizard was killed and prepared by a group of older women as a demonstration to their younger colleagues. While doing so the women discussed the healing properties of the lizard's meat, how its skin can be dried and used in crafts and the various medicinal values of its other body parts [**Appendix X**].

4.5.2.1 The preparation of medicines and special foods

A number of traditional Tikuna medicines use reptiles in the special preparation of treatments but these are known by only a few adults and elders in Mocagua and San Martín. Indeed, Wilbert [1972] found that among forest-dwelling societies specialised knowledge was taught to few select people as this ensured the limited use of highly-valued resources. Similarly insects and amphibians were only eaten by some people in Mocagua and San Martín who knew how to locate and obtain these foods [**Chapter 4, section 4.4.5.3**]. For example the *mojojoy* grub requires special harvesting techniques to acquire it as it develops in the heart of the

‘*cananguchu’* palm as one must cut deep into the trunk to obtain the larvae. This process involves cutting into tree trunks until the *mojojoy* are found, a process which can sometimes take several hours and kill numerous trees. Despite complex harvesting techniques the *mojojoy* palm weevil is the only insect still consumed by the Tikuna in Mocagua and San Martín. This is because of cultural beliefs and practices, descending from both indigenous and Catholic belief systems, which identify the insect as an auspicious food. One elder explained; “*The mojojoy is the food of the saints. Ancient Tikunas who lived in the ‘canunguchu’ groves used to bathe in a soup of mojojoy and maize. They were saints and later became doves*” [J. Cayetano, 70 years of age, Mocagua]. This description derives from the larvae’s metamorphosis into a beetle which can be seen flying away from the *canunguchu* palm in the later stages of its life cycle. It also illustrates how notions from Christianity, such as saints and doves, have merged with traditional folkstories and influenced people’s perceptions about wildlife.

4.5.3 The hunter-prey relationship

It has been suggested that hunting practices and the ways in which the Tikuna interact with prey are key to upholding reciprocal relationships with wildlife, and a number of detailed hunting practices and rituals were described by local people in Mocagua and San Martín [**Chapter 3**]. One hunter explained, “*When a hunter tracks an animal he becomes his prey, and when he eats the meat he takes on its properties*” [Male participant, 40 years of age, November 2009]. Cabrera reports in his PhD thesis [2012] that Tikuna hunters perceived what he saw as animals feeding at a mineral lick, as people drinking *masato*; *“An animal that is being hunted by humans at a lick will see its pursuer as a jaguar and itself as a human; a tapir drinking mud in the lick will see the mud as cassava beer (masato); and the jaguar stalking a human will see its prey as a peccary”* [Cabrera 2012: 48]. De Castro [2004b] explains this as ‘perspectival multinaturalism’ which assumes that all sentient beings see themselves as persons; “*Their subjective worldview is identical to the way the observer sees him or herself*“ [**Chapter 1, section 1.3.3**]. In line with this theory, given that animals are persons, rituals and beliefs surrounding the killing of prey for meat are particularly important. Willerslev [2007] claims that animals are only considered edible by some societies because of beliefs that dead animals are reincarnated. The transformation from wild animal to prey was described by local people during this study, as an exchange of clothes or the

disrobing of a cloak which is interchangeable and worn by chance; "*When an animal is killed the dueño allows the animal to remove its cloak and then become prey"* [Male participant, April 2009]. Similarly, Costa [2007] reports that the Kanamari transform game animals into meat by removing the blood and skin of the prey to de-subjectivise them.

4.5.3.1 Bushmeat consumption

Although eaten less frequently than fish, bushmeat constitutes a considerable part of the local diet in Mocagua and San Martín and is preferred over domestic and tinned meat for a number of social and cultural reasons. Meat is referred to as an essential element of people's diets worldwide and 'meat hunger' is recognised as a widespread phenomenon amongst people living at a subsistence level [Fiddes 1991; Ross 1978; Sahlins 1977]. Indeed, in Mocagua and San Martín a serving of food without meat or fish is not considered a proper meal. One woman commented; "*I haven't eaten all day! Only plantain, yuca and rice. My husband didn't go hunting so we had nothing to eat!*" [Female participant, February 2009]. Maldonado [2012] suggests that local prey abundance is low close to the communities in ANP and prey choice is now sparse. Indeed, elderly participants reminisced of a time when meat was abundant and prey were found close to the community; "*You could walk just 20 minutes. There were monkeys everywhere. It was easy to find food and there were plenty of animals in the forest"* [Hunter, 45 years of age, Mocagua, March 2008]. To overcome prey shortages people now consume animals that were once traditionally avoided. For example an older man explained that in the past deer were feared by local people and could not be eaten because of demonic associations assumed by the horns on their heads. Now, however deer is a popular meat [Hunter, 71 years of age, San Martín]. Consequently, some foods are particularly sought after because of their scarcity and the decline of a number of large mammal species has established their meat as highly valuable. Indeed, on several occasions I saw hunters returning with kill 'swarmed' by women and children from the village who were hurrying to buy meat before it was gone.

Murcott [1996] proposed that among the Lele of Zaire it is considered an insult to offer only vegetables to a guest because "*Meat is the most highly prized food. It is the centre around which a meal is arranged"* [*ibid.*]. Nietschmann [1974] reported

how Miskito societies regard the absence of meat as a time of sorrow and apathy and that, "*Without meat, women may refuse to prepare food*". Among some societies hunger in a general sense is differentiated from hunger caused by a lack of meat. The Canela of Amazonia for example replace the phrase, "*Il mo plam"* which translates as "I am hungry", with "*iiyate",* meaning "*I am hungry for meat*" [Gross 1975]. De Garine and Pagezy [1990] have explained this as a psychological stress brought on by a decreased availability in prized foods, rather than an actual deficiency in protein or calories. Indeed, Orlove [1997] showed that being deprived of meat was equated to starvation by a number of such societies. Even plentiful cultivated and foraged foods are considered inadequate to meat (e.g. The !Kung of the Kalahari only consider meat as 'food', Marshall 1961) and peoples who rely on cultivated plants such as plantains, bananas, tubers and grains demonstrate a strong preference for meat above other foods [Hyndman 2001; Redford 1993; Kerr and Crow 1986]. Indeed, previous studies of forest-dwelling peoples suggest that bushmeat provides the majority of protein and fats in local people's diets, while cultivated crops and domestic livestock only partly substitute their nutritional requirements in times of shortage [Townsend in Robinson and Bennett 2000; Stearman 1994; Dufour 1983; Yost and Kelley 1983].

4.5.3.2 Transferrable properties

A preference for meat is often associated with the belief that certain attributes will be passed on from the prey to the consumer when it is eaten. For example, the Tikuna believe that characteristic properties of different animals (e.g. 'climbing' monkeys, 'swimming' otters) are transferrable between species through the ingestion of their body parts. In this vein hunters feed the innards and organs of prey to their dogs to improve their sensibility towards other species [A. Barona, December 2012]. Conversely, those body parts of animals associated with taboo, illness or danger are carefully discarded when an animal is killed. Examples among the Tikuna include the tapir's tongue which is cut out immediately after the animal is killed and left in the forest [**section 4.5.1.4**], and jaguar skin, teeth and claws which may not be touched by older people or children for fear of fatal diseases being transmitted to them [Hunter, 53 years of age, Mocagua]. A renowned property of meat is the strength, stamina and power it engenders [Gurven and Hill 2009; Bird-David *et al.* 1991; Hawkes 1990] and indeed the bravery required to obtain it. As well as providing protein, strength and status,

killing prey has certain eminence attached to it. It is suggested that hunting is a sign of men's willingness to take physical risks and 'showoff' their strength and coordination [Bird-David *et al.* 1991]. Children in Mocagua and San Martín are not permitted by their families to go into the forest alone and only men of certain esteem are considered "real hunters who eat meat".

Bird-David *et al.* [1991] showed that the very presence of meat induced energy and triggered adrenaline among hunters, while Richards [1956] claimed that, "*When meat is abundant The Bemba of Zambia dance through the night and work through the following day. They attribute this outburst of energy to strength gained from eating meat*." Similarly, Scheper-Hughes [1993] reported that meat was the only food capable of satisfying the appetite of male Brazilian workers. She wrote that one Brazilian worker said; "*[I] eat a huge mound of beans, rice, noodles and as much meat as possible. My sister knows that I need the 'força de carne' [strength of meat] to work hard*". Furthermore, Bourdieu [1984] has described how "working-class" men in some parts of France avoid eating fish in place of meat as they believe this implies qualms about their masculinity: "*[I]n the working classes fish tends to be regarded as an unsuitable food for men not only because it is light food, insufficiently filling...Above all, it is because fish has to be eaten in a way which totally contradicts the masculine way of eating. Nibbling or picking, as befits a woman, rather than with wholehearted male gulps and mouthfuls*." Bourdieu's account is somewhat reflected in my findings among the Tikuna, as it was only the women who admitted to preferring a lighter meal of fish instead of meat (specifically when accompanied with açaí[30]) [Female participants, December 2009] in spite of the high frequency that fish was consumed by both sexes in Mocagua and San Martín during the study. An overall preference for meat may also be representative of the availability of these two food groups, as rare foods like meat are sought after [**section 4.5.3.1**] whereas an abundance of fish means that people may tire of the taste more quickly.

[30] Açaí is a traditional drink made from the nuts of the *Euterpe oleracea* palm, processed into a thick yoghurt-like drink and typically eaten with fariña and sugar. Recognised as a 'super food' in the West, it is known to be highly nutritious and a favourite among people in the Amazon. The preparation of açaí involves many stages and can take up to a whole day. It is therefore associated with important social processes that bring together women to share in gossip and folkstories [Dunbar 2004].

4.5.3.3 Status and prestige

The acquisition and provisioning of meat in Mocagua and San Martín demonstrates the role of food in establishing social structures. For example, woolly monkey and tapir meat was observed being shared among village elders and close relatives as a sign of respect to them from younger family members during the *Pelazón* ceremony[31]. Similarly, Wellenkamp [1988] described how during Toraja funeral ceremonies in Indonesia the exchange and division of meat made important statements about the ranking of relatives and friends of the deceased. Furthermore other studies suggest the sharing and sale of meat following a hunt enhances the stature of the hunter [Gurven and Hill 2009; Bird-David *et al.* 1991], which may lead to social rewards depending on the hunter's age and repute [Marlowe 2010; Marshall 1961]. Subsequent publications have similarly acknowledged the integral role of meat in cultural and social affairs as a marker of status [Kitahara-Frisch 1982; Gould 1981; Damas 1975; Le Gros Clark 1968]. Marshall [1961] proposed that the distribution of prey among the !Kung Bushmen contributed towards establishing social structures and hierarchies, while Le Gros Clark [1968] reported that in Uganda people frequently sacrificed up to four days' worth of plantain in exchange for one small chicken, with less than a twentieth of the nutritional content but a higher social status. The processes involved in acquiring and preparing meat are also recognised as being central to people's identity [Bird-David *et al.* 1991]. The word Eskimo for example is derived from '*eskimansik'* meaning "*eaters of raw meat*" [Murcott 1996]. Indeed, Lévi-Strauss and Willis [1987] claimed that, "*The combined activities of food preparation, feasting and drinking enable us to "act out being civilised rather than wild which is critical to our social development"*.

Wilbert's study in 1972 suggested that food preparation techniques were especially important among hunter-gatherers where food shortages were feared or expected. Still today, the preparation of traditional foods is of such importance to Tikuna women in Mocagua and San Martín they chose to make a series of short films about it, in which they explain the significance of steaming, stewing, roasting, frying, boiling, salting and drying as prescribed ways of preparing and preserving meat and fish. Although they placed great magnitude on these skills, salting and

[31] The *Pelazón* ceremony is carried out to celebrate the coming of age among young Tikuna women. The girls' hair is cut and they are covered in feathers from various birds and adorned with jewellery made from snail shells, seeds and other decorative finery.

drying are hardly carried out any longer as people can buy foods when their stocks run low. Among other things informants reported that at one time foods were traditionally fried using animal fat or the lipid rich juices of *mojojoy* but now vegetable oil bought from the local store is used instead.

Young women are thought to acquire this information by observing adults and through casual chat whilst carrying out female centred tasks [Brown 1986]. However, this information does not appear to be passed down to children in the communities although women shared extensive knowledge about animals as food and in medicines [**section 4.4.3.3**]. This apparent lack of knowledge may be because children no longer have the time to participate in practices at home as they are encouraged to study and do their homework. Similarly, despite the importance of food sharing by men there were implications from a number of informants that some men prefer to sell spare provisions rather than share it with friends and relatives [G. Cayetano, 41 years of age, Mocagua]. Data from the study indicate that traditional practices such as food preparation by women and the provisioning of meat by men play a key role in shaping local conceptualisations of wildlife, and these are of particular significance to the Tikuna because they represent an important part of Tikuna heritage, culture and identity.

4.5.3.4 Fishing and hunting methods

In the past, traditional hunting methods used by the Tikuna required in-depth knowledge, not only about the forest, but also about the preparation of tools and toxicants such as blow guns (‘*pucuna’*) and venom (‘*curare’).* In Mocagua and San Martín these tools were replaced with shotguns more than 60 years ago which has significantly increased hunting rates [Maldonado 2012]. In his study of the Tikuna as early as 1952 Nimuendajú suggested the discontinued use of venom and blow guns was directly related to a loss of knowledge among the Tikuna. Indeed, only a few elders now own a *pucuna* or know how to identify the plants required to concoct *curare*. Similarly, fishing with a line or hook is practiced by the Tikuna from a young age however fishing at nightfall is high risk and can only be carried out by men who know the river well. Locating heavy nets at dusk and dragging them out of the water requires good upper body strength, stamina and navigational expertise [Fisherman, January 2009]. Despite these details informants suggested that fishing required fewer skills than hunting because of the proximity of the river

to the village, in comparison to the long treks which are a necessary part of hunting. One young man commented, "*There is no need to go hunting. I can catch fish instead. It's much more difficult to walk in the forest and look for animals"* [Male participant, 19 years of age, Mocagua]. Ready access to rifles and dogs means that some young men occasionally set out on spontaneous hunting trips however, but low prey densities force hunters to travel further to locate prey and this requires good knowledge of the forest.

4.5.3.5 Availability

While meat was not always available to local people during the study evidence suggests that people in Mocagua and San Martín rarely go without both meat *and* fish, and that when they do it is either because of limited availability or a lack of time to go hunting or fishing, rather than through choice. Similar to evidence from other hunting societies tapir, deer, paca and agouti were the most frequently eaten prey items because of their availability and size [Robinson and Bennett 2000; Rival 1998; Dufour 1983]. The frequency that domestic and bought foods were consumed in Mocagua and San Martín provided a legitimate indication of economic wealth. Domestic meat is only available to some people (because of esteemed prestige and financial solvency) and tinned food is considered an expensive unsatisfactory substitute; "*Tinned sausages are tasty but they cost a lot...We like to eat 'real' meat and fish from the rive*r" [Hunter, 42 years of age, San Martín]. Buying and caring for livestock is an expensive investment and only those families with a regular income can afford to do it well. Frozen chicken and beef are also expensive to buy, transport and store. There is a freezer in Mocagua's school which runs on gasoline, but this must be bought from Leticia adding yet more expense to the safe storage of frozen meat. During the study meat was bought for special events where the communities pooled their resources and received contributions from visitors (e.g. Mother's Day in Mocagua). Tourist development in ANP has seen the increased solvency of some families in Mocagua which means they have increased access to domestic meats but numbers are still low.

4.5.4 Local adaptations and outside intervention

Most people in Mocagua and San Martín recognise the value of wild animals in research, tourism and conservation which supports the suggestion that local people's perceptions of wildlife adapt in response to ideas introduced by non-

indigenous peoples. This was evidenced through conversations with local people and by the species lists written during workshops. For example people said the jaguar, tapir, woolly monkey and dolphin are all integral to the continuation of tourism, research and conservation in ANP. This was relayed through comments and conversations about the aquatic mammal conservation group 'Omacha', 'The Piuri Project' (which supports the conservation of the wattled curassow), 'The Animal House' and 'The Woolly Monkey Project' [described in **Chapter 1**, **section 1.5.7**]. Furthermore, participants suggested that tourists are only interested in seeing large, rare animals, and so these are deemed the most important animals to protect. Elders proposed that tourism and conservation projects engender an ardour for money over reciprocal relationships with the forest however, children spoke informatively about the protection of certain species and expressed concerns over their welfare as a result of what they had learnt through environmental education provided by visiting researchers and conservationists. For example, one child said, "*The Piuri is the most important animal for food. It has other benefits too. Monkeys are important for the conservation of the forest...and you can show them to the tourists*" [Male participant, 11 years of age, Mocagua].

As previously mentioned the relatively low number of wild animals kept as pets may also be partly explained through the influence of conservation initiatives and environmental education in the region. Other research has shown the population densities of some wild animal species in Mocagua and San Martín is on the increase as a direct result of long-term conservation initiatives [Maldonado 2012; 2010]. The higher number of curassows recorded in dietary logs from Mocagua when compared to San Martín can be explained through efforts by 'The Piuri Project' to semi-domesticate the bird and rear it as a source of meat. People's comments about primates also reveal insightful information about the impact of conservation research and tourism on their attitudes towards wildlife. A number of people disapprove of primates being hunted because of the long-term consequences on the ecosystem and local economy. Local opinion is divided however, while some people are happy to eat protected species others strictly follow the advice of researchers and ANP staff and condemn the practice. These factors will be considered in **Chapter 6**.

4.6 Conclusions

- Wildlife fills multiple roles for people in Mocagua and San Martín based upon its nutritional, social, medicinal and cultural value, while research and tourism add new components to human-wildlife interactions such as economic incentives and concern towards species that are conservation priorities.
- Wild animals are used by the Tikuna either for specific or varied functions and some are identified as 'culturally key' species. These animals hold important associations with folklore and traditional beliefs as well as providing vital foods and medicines to local people.
- The role of animals as food reveals insights into inter-species interactions and social structures among the Tikuna, such as hunter-prey relationships, pet-keeping, food preparation and the provisioning of meat according to social status.
- Hunting, fishing and keeping wild animals are important cultural activities for the Tikuna however local customs and regulations implemented by ANP officials place restrictions on how frequently these practices can be carried out.
- As traditional practices adapt to environmental and social changes local people's perceptions of animals and their interactions with wildlife change too. This is seen in the methods used to harvest wildlife such as the ownership of rifles and dogs used for hunting.
- Some animal taxa are more commonly eaten than others in Mocagua and San Martín. This depends upon a number of factors including preference, resource availability, perceived nutritional quality, cultural importance and the level of hunting and fishing skills required to access certain foods.
- As well as wild meat and fish, domestic and tinned foods are also eaten. These foods do not provide any of the transcendental properties acquired through the consumption of wild animals however, and livestock is expensive to rear so its consumption is largely determined by family income or status.
- Adults convey specialised ecological knowledge about wildlife in Mocagua and San Martín but children know only a fraction of this information. Instead their understanding of wildlife is influenced by school lessons, environmental education and the example set by tourism to capitalise on wildlife and nature.

Chapter 5

Shamanism, folklore and traditional knowledge

Chapter 5: Shaminism, folklore and traditional knowledge

5.1 Introduction

This chapter investigates the influence of education, traditional knowledge and local belief systems on human-animal interactions and species classification in Mocagua and San Martín. Intergenerational comparisons are made between the elderly and the young to examine how individuals learn about the environment and the influence this has on their perceptions of wildlife.

5.1.1 Indigenous knowledge systems

5.1.1.1 Cultural references and true names

Ethnoclassification provides insightful information into human-animal interactions and the structure of cultural belief systems [Dwyer 2005; Ingold 2000 and **section 4.1.1.2**]. The assemblage of living things into organised groups is recognised as being either: species specific; descending from a common ancestor through taxonomic linear classification; or constructed from a traditional belief system which complies with an alternative set of guidelines [Dwyer 2005]. In his 1996 publication Descola proposed that indigenous societies give humans, animals and plants designated labels which express the authentic nature of their beings. This, he refers to as their 'true names'. 'True names' differ between cultures and are a fundamental component of peoples' local environmental perceptions. Similarly, Weiner [1991: 50] wrote; "*Through naming we transform an unmarked environment into a humanized, historicized space*". This idea has since been central to a number of philosophical and grammatical studies about the relationship between indigenous cultures and nature, exploring 'magic', religious invocation and mysticism as central themes [Dwyer 2005; Hunn 1982; Lévi-Strauss 1966].

A wide literature exists on ethnoclassification and a number of theories have been put forth. Early ethnoscients suggested the mental processes underlying environmental classification were based upon reductionism [e.g. Strenski 1976]. Through his extensive publications the anthropology of Claude Lévi-Strauss drew

similarities between Western society and indigenous cultures and posited a number of structures that underly the things humans do, the way they think, perceive and feel [Lévi-Strauss 1976; 1967; 1966; 1963; 1962]. He proposed that the structuralist explanation was a means of organising real data in a simple effective way that could be more easily managed; *"Classification, comparison and naming may be seen as a single, indissoluble process. Objects are given "bundles of relations" as part of the process of intellection itself*". Strenski [1976] however suggested Lévi-Strauss sought to deduce 'deep' meanings from these seemingly shallow surface structures and generated models of human-nature affiliations that removed any dichotomy between nature and culture. Following this, the work of Conklin [ethnobotany of the Hanunoo of the Phillipines, 1967] and Hyndman [New Guinea Wopkaimin hunters, 1984] were among the first to consider human-animal interactions and their relationship to the natural world in more holistic terms, exploring perception and classification within an anthropological framework.

5.1.1.2 Folkbiological taxonomy

Folkbiological taxonomy is a way of understanding and describing some of the structures recognised by different cultures when classifying animals. The naming and classification of wildlife has been a point of interest to anthropologists for some years [Kohn 2002; Descola 1996; Hunn 1982; Lévi-Strauss 1966] and the underlying principles of folkbiological taxonomy have long been debated [Dwyer 2005; Berlin 1973; Lévi-Strauss 1966]. Dwyer [2005] suggests the labelling of taxa that are assigned to categories, inherently exhibits characteristic linguistic features of the society to which they belong. He explains, linguistic features are usually not recognised cross-culturally and therefore provide a useful tool when making comparisons between different peoples understanding of their environment and other organisms. Moreover this suggests that mono-typic biological classification systems endorsed through science create inaccurate models when seeking to grasp folk biological taxonomy. The study of ethnoclassification, by comparison, draws together relational, ecological and developmental components to assume a comprehensive viewpoint of human-animal relationships and understand the depth of folk taxonomic systems [Ingold 2000].

Dwyer [2005] proposes that Berlin [1973] and Bulmer [1974] were two of the earliest most influential authors on the subject. By setting out taxonomic categories Berlin used pre-determined groupings to understand local classification systems. Berlin's [1973] work has however been criticised for being rigid and uncompromising, while Bulmer's work [1974, 1967] proposed a more fluid hierarchical ranking of taxa which acknowledged the recognition of multiple forms of existence. Berlin's 'intellectual' view is concerned with the *cognitive processes* involved in naming and classifying animals [Berlin 1992; 1973], while Bulmer's 'utilitarian' perspective stems from emic concepts, which recognise a close relationship between experience and knowledge in the ways that people classify the world [Hunn 1982]. In this chapter an approach more similar to Berlin's utilitarian view will be adopted. This offers a chance to consider inter-species affiliations according to a multitude of coalescent cultural, social, environmental, political and economic cues through ethnoclassification [Ingold 2000].

5.1.2 Knowledge and perceptions

5.1.2.1 The acquisition of knowledge

Bang *et al.* [2007] suggest that knowledge and experience shape the way human's perceive their place in nature. As Ingold explains it; "*[P]eople think the thoughts they do because they dwell in and engage with the world*" [2000: 186]. The type of ecological knowledge we acquire is therefore influenced by our associations with nature which consequently create our environmental perceptions [Descola in Kohn 2002]. This can be seen in the way males and females form specialised bonds with wildlife depending on gender-specific roles in the community, which influences their knowledge and perceptions about different animal species [**Chapter 4, section 4.1.2.2**]. Disparities between the elderly and the young are also common. For example, it has been widely recognised that Traditional Ecological Knowledge (TEK), which is more familiar to older people in Mocagua and San Martín, fosters close relationships between people and nature [Williams and Baines 1993; Johannes and MacFarlane 1991; Clarke 1990; Morauta *et al.* 1982] and this serves as a foundation to the transmission and acquisition of cultural practices [Atran 2002, 1998]. TEK is defined as: *"[A] body of knowledge built by a group of people through generations living in close contact with nature. It includes a system of classification, a set of empirical observations about the local environment, and a*

system of self-management that governs resource use [Studley 1998]. Indeed, Kohn [2007] suggests TEK is incorporated into music, song, dance, ceremony, dream interpretation and storytelling, all of which involve various modes of communication and contact with other species. Furthermore, Berkes [1993] points out that TEK is "*[H]anded down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment"* [Berkes 1993]. Contrary to this, Nisbett's [2004] study which looks at how children learn about the environment suggests socialisation and the way children are taught produce different types of perception and reasoning to those formed through TEK. This, he proposes is an unconscious learnt behaviour separate from intellectual reasoning through mindful discovery which must be taught through observation and experience.

5.1.2.2 Folklore and moral ethics

Several studies within Amazonian societies have shown that folklore is constitutive in shaping indigenous belief systems and transmitting information about the forest and wildlife [Descola 2009; Kohn 2007; Rosenberg 1997]. Some folkstories stipulate rules that determine which animals become food and which are protected through dietary taboos [Simoons 1998]. Descola [2009a] claims that through storytelling hunters learn about the behaviour of wildlife, which animals should be listened to and which should be treated with caution. Indeed, folkstories are described by Rosenberg [1997] as; "*[T]ales of pure fiction that have no particular location in either time or space, but yet symbolically represent means by which human-beings relate to their world*". The messages conveyed through these stories are established within societies as they are told and retold, and passed down through generations [Ilomäki 2002]. For example, Ilomäki [2002] reports that in ancient Finnish hunting spells animals are categorised according to how they move (e.g. flying, running or rolling), their fur type (e.g. monkey fur, fur ball or bunch of wool) and the interests of the hunter [Ilomäki 2002], while Alcorn [1995] refers to the process of learning through folklore as 'adopting customary scripts' which convey environmental ethics and teach the listener morals, strength, bravery and respect.

5.1.2.3 Modern education

While TEK and folklore have both convey different ecological knowledge to that learnt through schooling, in the context of forming connections with the land and understanding local environments, modern education is sought after by many rural peoples [Atran 2002]. Learning to read and write, and receive a formally recognised education offers opportunities which would otherwise be unavailable. Understandably, many young indigenous people wish to go to university and find long-term employment [Patrinos and Psacharopoulos 1997]. As discussed in **Chapter 3** however, it has been suggested that where schooling and the written word replace traditional ways of learning children loose an in-depth appreciation of nature and an inherent connection with their territory [Marguilis 1999 in Harding 2006; Lima 1998]. For example, Medin and Atran [2004] report how young generations of indigenous children who receive a modern education categorise nature using a language more similar to that spoken by college students from urban areas, rather than using the 'true names' used in local traditional classification systems. Where children's experiences in the natural world are limited this not only creates a disinterest in wildlife but is proven to have long-term negative implications on children's health and well-being ['Nature-Deficit-Disorder' or NDD[32], Louv 2010]. These concepts draw attention to the impact of epistemological processes in defining people's perceptions of wildlife and relationships with non-human species.

[32]NDD **r**efers to a hypothesis posed by Richard Louv in his 2005 book *Last Child in the Woods*, which suggests that human beings, especially children, are spending less time outdoors resulting in a wide range of behavioral problems and mental disorders.

5.2 Hypotheses

The following hypotheses will be explored to examine how local people in Mocagua and San Martín classify wildlife and the influence of cultural, social, environmental and economic factors:

i) Disparities exist between the ways old and young people in Mocagua and San Martín classify wildlife because children learn about nature through pedagogical processes different to those experienced by the elderly.

ii) Older people describe folk taxonomic classification derived from traditional knowledge while young people construct their views and opinions about wildlife based upon education, conservation and tourism.

iii) The absence of a shaman in Mocagua and San Martín means local people's perceptions of wildlife and how they treat animals have transformed in recent years. This has created the cause for new interactions between people, animals and the forest in ANP.

5.3 Methods

5.3.1 Differences between the elderly and the young

Group discussions and semi-structured interviews were carried out mainly with older people during the study. These methods were more well-suited to them than written tasks and a good way of acquiring information about folk classification as participants were able to discuss things freely and at will. Their explanations were often lengthy and usually involved a folkstory being told or a reference to an example from their own lives. Conversations and semi-structured interviews took place with children and young people in the school and with adults and the elderly at home and in the forest. The species lists written by different aged participants during workshops were also examined to compare the ways in which adults and children categorised animals. Data from male and female participants were pooled into two age groups for this (5-15 years and 16-60+ years). I compiled a list of dietary taboos and other restrictions related to human-wildlife associations, through a combination of observations made in the community and conversations held with people of different ages, recording details about the conditions stipulated through the taboo and from where these had originated. Information about informants was also recorded.

5.3.2 Animal classification exercises

Elders from Mocagua and San Martín were invited to take part in a series of group discussions about Tikuna folk taxonomy during which they shared ideas about animal classification and traditional folkbiology. Older informants were less willing to communicate to begin with so this activity took place towards the end of the second research phase once good relationships had been established with people. The method was chosen as being more appropriate than other more standard anthropological practices to determine classification systems, such as asking participants which items are most alike or different [Atran 1998], because it allowed conversation to flow freely in a manner more similar to traditional modes of conversation and reasoning familiar to older people in the village. Furthermore, from previous experience I felt that ‘setting-up’ an activity for older people to attend would deter them from participating. Allowing a more flexible structure not only reduced the built-in constraints of standard anthropological methods but also avoided inaccurate results created through my own interpretations. With the

assistance of a young person from San Martín to translate the elderly informants who took part were able to produce a diagram to illustrate the ‘family’ groups which different species belonged to. These were interpreted as being ‘maternal’ groups, rather than paternal or evolutionary families, because the participants said that each species was protected by ’*el madre*’ meaning its mother, who cares for all individuals of her kind and punishes those who do not comply with the established rules of reciprocity and equity. These ideas stem from the Tikuna creation myth which states that all life dwelled in the great *ceiba* tree, a tree known to be inhabited by the mother of the forest *‘el madre de mato*’ [**Chapter 1, section 1.6.4**]. This information proved critical when interpreting species lists compiled by different age groups and deciphering the many comments and observations accumulated during the study. With assistance from a local translator I later produced a “species classification tree” written in Spanish and Tikuna with English translations where possible. Further details of the methods used are provided in **Chapter 2**.

5.4 Results

5.4.1 Knowledge discrepancies between age groups

The length of the species lists written by adults (16-60+ years, n=92) and children (5-15 years, n=137) during workshops [**Chapter 2, section 2.4.3**] were compared to examine the ways in which different aged participants categorised animals. This was telling about their perceptions of wildlife and the principles they used to classify species. Men and women, up to and including individuals of 59 years of age, came to separate workshops. These were later divided into sub-groups because of the high quantity of people who attended. Older men and women (60+ years) took part in the same workshops as each other, split into groups of ten each with a young person to scribe and assist with translation. These data were pooled to form one data set labelled 'adults' for comparative purposes. Children completed the activity at school. Every class was visited a day at a time and arranged into groups of between 6 to 15 individuals. Adults and the elderly were given as long as they wished to complete the task whereas children were limited to an houras this was the duration of one school lesson. The length of each list compiled by children and adults is given as a percentage calculated from the total number of species named for each category by both age groups [**Table 5.1**]. Data show the lists written by adults and children were comparatively different lengths (Pearson's χ^2=38.54, n=864, df=5, p<0.01) which implies discrepancies between adults' and children's perceptions of animals. Adults named over twice as many species as did children overall [underlined in **Table 5.1**] and the species named by 16-60+ year olds for each reference category were also more diverse than those named by 5-15 year olds.

Table 5.1 Percentage of animal species named for six reference categories by adults and children in Mocagua and San Martín calculated from the total number of species named in each category by both age groups [underlining indicates data referred to in text]

	Adults		Children		
	n	%	n	%	Total
Pets	149	64	83	36	232
Food	183	64	102	36	285
Arts and crafts	81	75	27	25	108
Medicine	65	87	10	13	75
Tourism	71	79	19	21	90
Folklore	93	53	82	47	165
Total	632	66	323	33	955

5.4.1.1 The impact of schooling

In their species lists the girls named significantly more animals associated to folklore compared to all other participants (37% of the total number of species named across sample population) [underlined in **Table 5.2**]. This suggests an extensive knowledge on the topic which can be explained through the children's lesson content at the time of the study. Boys showed less interest in the exercise and demonstrated low levels of concentration. They named a consistently low number of species across all six categories accounting for only 9% of the data [bold in **Table 5.2**] which suggests their lists may not be truly representative of their full knowledge.

Table 5.2 Percentage of animal species named for six reference categories by men, women, boys and girls in Mocagua and San Martín calculated from the total number of animals named in each category by participants [underlining and bold indicate data referred to in text]

	Men		Women		Boys		Girls		
Category	n	%	n	%	n	%	n	%	Total
Pets	61	26	88	38	18	8	65	28	232
Food	80	28	103	36	26	9	76	27	285
Arts and crafts	45	42	36	33	15	14	12	11	108
Medicine	24	32	41	55	3	4	7	9	75
Tourism	30	33	41	46	10	11	9	10	90
Folklore	32	18	61	35	18	10	64	37	175
Total	272	28	370	38	90	**9**	233	24	965

5.4.1.2 Perceptions of hunting and fishing

The range of opinions collected following discussions and interviews with local people reveal that different environmental perceptions exist between the old and the young in Mocagua and San Martín. Their attitudes towards traditional practices, including hunting and fishing also vary. During conversations with children 80% of informants said they went fishing while less than half expressed an interest in learning to hunt (41% n=124). One boy remarked; "*I don't need to go hunting. I plan to get a job in the city and earn money when I finish school"* [Male participant, 13 years of age, Mocagua]. Similarly, where children and young people were asked about their future prospects most said they wanted to receive a further education and find employment when they graduate (62%, n=8). As well as a loss

of interest in traditional hunting practices a common suggestion among older people was that a lack of understanding about TEK and Tikuna folklore among the young has a negative impact on their relationship with nature. Despite these assumptions a group of eight 15-24 year olds from San Martín expressed an avid interest in learning about traditional Tikuna knowledge from older people in their community and chose the theme "Tikuna folklore" as a topic for a film project [**Chapter 2, section 2.4.8.3**]. They interviewed nine elders in the community and asked them questions about dreams and folklore. I later watched these recordings to acquire important information about Tikuna belief systems which are referred to in the discussion that follows.

5.4.2 Tikuna folk taxonomy

The species classification tree generated through group discussions with elderly participants illustrates some central aspects of Tikuna folklore and traditional taxonomic classification principles [**Appendix XV**]. Of particular interest for this study is how Tikuna folk taxonomy differs from Western taxonomic structures. While local people from Mocagua and San Martín grouped some animals based upon their physical characteristics, resembling reasoning more familiar to Western biological taxonomy, this was rare. For example, one informant said; "*The 'agouti' (paca) is in this group as it has the same feet as the 'danta'* (tapir) *and eats grass and things from the ground. It has a small tail. The 'boruga'* (black agouti) *likes to bathe in water and also has a small tail"* [Male participant, 67 years of age, San Martín], while another man commented; *"The 'venado'* (deer) *have their own family as they already have a short tail*" [R. Santos, 73 years of age, San Martín]. In this remark the informant tellingly uses the expression "they *already* have a short tail". Further conversation explained that this was with reference to the folk belief which tells that in losing their long tails a number of animals transformed into short-tailed or tailless creatures, such as the woolly monkey which later became a sloth [detailed in **section 5.4.2.6**]. More commonly other factors such as species' specific behaviours and habits were discussed among participants in order to correctly add them to their corresponding families.

Indeed, many principles which appear to be central to Tikuna folk taxonomy are distinct from the processes used to affiliate animals through Western taxonomy. For example, local people grouped the 'chiwy' or tamandua (*Tamandua*

tetradactyla) with the Colombian night monkey, the sloth and the kinkajou, and yet according to Western ecology books it belongs to the Anteater genus Tamandua. By contrast the giant anteater (*Myrmecophaga tridactyla*) which is from the same scientific order as the sloth (Pilosa), according to Tikuna folk taxonomy is from a different family to the sloth and tamandua. Elders explained that the *chiwy* displays a number of behavioural characteristics that liken it to the sloth and kinkajou, such as arboreal foraging and the rarity with which they travel across the ground. Further evidence collected during a hunting trip supported these ideas. When we chanced upon a tamandua hissing at us from the treetops a hunter remarked; "*Have you seen the chiwy in the tree. He's nocturnal and doesn't normally come out in the day. He can't get to the ground!! That's why he is angry at us!*" [E. del Aguila, June 2007].

5.4.2.1 Social hierarchy and protection

Another key feature of Tikuna folk taxonomy is that wild animals are arranged according to an established social system which reflects the community and kinship structure of Tikuna society. Participants explained how certain species possess a talisman ('*pusanga')* which attracts other animals. In the case of the red-throated caracara *(D. americanus)* known locally as the '*gavilán tatatao*' or '*grandmother of the forest*' her *pusanga* keeps other animals close by, allowing her to offer them protection from danger. The organs and limbs from species endowed with *pusanga* are also used by the Tikuna to maximise their chances of finding a partner and carried by hunters to increase their prospects of summoning prey. Animals with *pusanga* are at the top of the animal social hierarchy and hold prime position in the species classification tree. For example, the *galiván tatatao* is drawn at the top overlooking all the animals in the forest. She is assisted by small birds which act as her advisors; "*The small birds that live on branches, and the hummingbirds that fly alone, tell the 'tatatao' when people or jaguars are nearby. She lets the other animals know, so that she can warn them. Small animals follow the birds and they stay close to the tatatao so she can protect them*" [Hunter, 63 years of age, Mocagua]. The organisation of the small birds and the *tatatao* is likened to the *Cabildo* who help the Tikuna headman or *Curaca* make decisions for the community. When hunters hear the cry of the *tatatao* during forest trips they return to the community for fear of danger or misfortune.

People also explained that winged animals who hunt using their claws belong to the same group as the *tatatao* and have precedence over those animals that forage on the ground. This holds parallels with hunters and their esteemed role in Tikuna society. All other birds were grouped separately including, parrots, poultry and the hummingbirds (‘*familia picaflor*’) which were identified as spiritual messengers because of their solitary behaviour; ”*Parrots, macaws and parakeets are different because they don’t hunt. Chickens and curassows are also separate as they live on the ground. The hummingbirds travel between realms and carry messages from the dueños”* [Hunter 56 years of age, San Martín],

5.4.2.2 Carnivores and hunters

Participants grouped most of the large carnivores on or at a similar level to the jaguar family (‘*familia tigre*’) because of their status and hunting prowess. The ‘*mariposa*’ or butterfly jaguar is said to be the most powerful and dangerous animal in this family as it is distinctly cryptic and can hunt during the day and the night; “*She will hide in the tops of trees and pounce on you from above*” [Male participant, 79 years of age, San Martín]. By comparison the cougar or black jaguar (‘*tigre pintada*’) is known to attack only at night, while the ocelot is smaller and unable to climb trees; “*‘El tigre pintada’ will watch you in the day but not attack until it is dark. The smaller one, ‘el tigre segundo’ stays on the ground to attack prey”* [Elderly participant, February 2009]. The ‘*jaré*’ is grouped separately from the other carnivores because, as it was explained, there are two sorts of *jaré* and neither are ‘real’ jaguars; “*One is big and prowls on the ground while the other is smaller and lives in the tree tops”* [Hunter, 75 years of age, Mocagua]. The smaller type are called ‘*poé’* and are likened to dogs belonging to the bigger *jaré*. Although the relevance of the *poé* was discussed in great detail by participants they were not drawn on the species classification tree as it was agreed that the *poé* come from the same realm as dogs which are domestic animals.

The association between *jaré* and *poé* somewhat mimics the relationship observed between Tikuna hunters and their dogs. One hunter said; “*Poé will track you so the jaré can kill and eat you. The poé are normal dogs but bigger and exist in many colours. They are patterned like dogs and cats but have the small head of a jaguar”* [Male participant, 64 years of age, San Martín]. People shared stories about encounters they had had with the *jaré* and in doing so provided further

evidence; *"In the Cotué I saw Its (jaré) dogs. One was black and the other yellow. They chased me, so I jumped into the water and out the other side. I knew they were the poé because they had no human owners. They were small like buri buri*[33] *but had faces like jaguars. They can jump on you from the tree tops and bite your head!*" [A. Naranjo, 32 years of age, San Martín]. Another participant added; "*The buri buri is the night monkey but it can eat people. It lives in holes and trees, above and below, and travels in the night and the day*" [Male participant, 61 years of age, San Martín]. Indeed, these testimonies demonstrate the blurred boundaries between species that are recognised in Tikuna folk taxonomy.

5.4.2.3 Habitat domain

The careful placing of each animal, by the Tikuna, in the classification tree also reflects its habitat domain and corresponds to its social position according to other species. The following narrative recorded with Don Agosto Moran [50 years of age, San Martín] illustrates how the behaviours of animals are understood by the Tikuna and neatly expresses the continuum that links humans to other animals according to the Tikuna worldview; "*When she [the tatatao] sings all the animals follow. Everything from the howler monkeys, to the saki monkeys. Animals that are high up and those that are low down. The toucan is the first to arrive as he can fly quickly. The monkeys take longer. They stop to eat on the way. Wild pigs are the only animals that don't follow. They run away. Maybe she tells them off?! She doesn't like the woolly monkeys because they bother her but they follow anyway!"* According to traditional Tikuna beliefs all animals have spiritual owners, or *dueños* who live in the upper realm with the *tatatao* and other birds. Participants drew smaller birds and winged animals below the *tatatao*. This included their spiritual forms which also have wings so they can transcend realms. One participant explained; "*All animals exist here [pointing to top of the page] as they all have wings*[34]" [Male participant, 63 years of age, San Martín]. Furthermore, the spiritual manifest-ations of animals have Tikuna names unrecognisable in Spanish or English. They include the painted tapir (*imi imi*) and wild dog families (*jaré*), the hummingbirds (*mü*), deer worms (*cowi ari omi), buri buri,* the *jacaroona* and the '*curupira'*.

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[33] Local name for a type of *Aotus sp.*

[34] 'Wings', in this sense can be interpreted to mean the 'spirit' or 'soul' of the animal.

The *curupira* was placed just below the *tatatao* in the species classification tree. As previously mentioned she is the mother of the forest and lives in the *Ceiba pentandra*, which is the sacred tree of creation according to Tikuna folklore. Legend tells that the *curupira* has backward facing feet and leaves traces which look like human footprints across the forest floor to confuse hunters and make them loose their way. Underneath the *curupira* and the birds that fly high are the low-flying birds such as humming birds; *"Humming birds that fly in groups of five have their own family and exist in many colours. They sing while they fly. These are the tiny hummingbirds that you can hardly see. They are called 'gusano de venado' [deer worms] or 'cowi ari omi' in Tikuna. There are many different sorts. Each has its own name"* [Female participant, 65 years of age, San Martín]. Similar to the hummingbirds, small parrots have various names in Tikuna which do not exist in Spanish or English and are no longer used by younger people in Mocagua or San Martín.

Although in a separate family to the hummingbirds other arboreal species including bats and squirrels were placed at the same level to them, followed by mid-canopy and terrestrial animals. Participants explained that primates were drawn at the same level as deer and tapir because they come to the forest floor to socialise with other ground-dwelling animals. The woolly monkey family ('*familia churuco*') contain all primates apart from the *buri buri* because of its links to the *jaré* in the spiritual realm [**section 5.4.2.2**]. The jaguar, armadillo, anteater, fox and wild dog appear in their relative families below the ground-dwelling animals because they are inconspicuous animals that hide in dark holes or among the buttress roots of big trees. Below this still, are the tortoises, turtles, amphibians and snakes. Following lengthy discussions with participants it was decided that species which could not be distinguished by their habitat domain should be placed mid-canopy.

5.4.2.4 Edible animals and 'real' species

The use of the prefix '*propio*' by the Tikuna distinguishes those which are 'real' animals and therefore not human and can be hunted. For example the painted tapir is not considered to be a real animal; "*The meat has no flavour. It is not good meat because it is not the 'danta propia' (real tapir)"* [Male participant, 60 years of age, San Martín]. Animals that are not 'real' are seen to share similarities with

humans and recognised as animal-persons [**section 5.5.2.1**]; "*Some animals like the tapir police have their clans. They are organised like the Tikuna. You cannot eat their meat*" [A. Pinto, 60 years of age, San Martín]. As mentioned in **Chapter 4** the tapir is associated to the spiritual realm and considered a dangerous and powerful animal. It is regarded as being separate from other animals for a number of reasons. One hunter told me; "*There are three tapir; imi imi, cenawā and the Tapir Police. They belong to their own group, separate from other animals"* [G. Llerreno, 46 years of age, Mocagua]. Indeed *cenawā* (one of the three spiritual forms of the tapir) was said to be the most dangerous animal in the forest by a number of elderly participants [Men and women, 60-75 years of age, Mocagua and San Martín].

A number of bat species were considered inedible by some older people because of their specialised diets and habitat niche; *"Some [bats] are eaten. They live inside the holes of trees and eat fruit. Bats that live under leaves eat insects and so cannot be eaten. Some of them live on sticks and others live with 'comejen' ants in small holes"* [Female participant, 72 years of age, San Martín]. Likewise, it was said that one species of *Aotus* monkey and one variety of sloth are not eaten. An elder explained; "*Only the white chested night monkey can be hunted. The red chested buri buri is the devil"* [J.Cayetano, 70 years of age, Mocagua]. Participants said that two types of sloth are eaten by people while the third cannot be hunted as it is large and has dangerous claws. Several of these people also said the tamandua is inedible; "*They (tamandua) cannot be eaten. I killed one once. It had a lot of blood!...and smelt very bad!"* [G.Cayetano, 41 years of age, Mocagua]. This opinion was not unanimous among the group however as a number of people suggested its meat has powerful healing properties.

5.4.2.5 Dangerous and powerful creatures

Large species such as the jaguar and the boa or anaconda were often referred to as "dangerous" or "powerful" during group discussions and local people feared meeting them in the forest. These animals hold parallels with the shaman, who typically lived at the edge of the village to distance lay people from his sorcery. Similarly, jaguars and boas travel alone and are said to be spiritual with the capacity to shift shape into animal-persons. As described in **Chapter 4** [**section 4.5.1.3**] the *jacaroona* water spirit takes the physical form of an anaconda and

causes illness and death to people [Male participant, 60 years of age, Mocagua]. The jaguar was also linked to the shaman because of a belief that the shaman could transform into this creature to wander the forest; "*The shaman could transform into the most feared and powerful animal in the forest*, *the jaguar*" [Hunter, 68 years of age, San Martín]. Although to a lesser degree, hunters were similarly wary of encountering giant otters *(Pteronura brasiliensis)*. According to Tikuna folk taxonomy the giant otter belongs to the same family as the jaguar but hunts in packs. Otters also travel alone, are capable of shape-shifting and are therefore revered for being both physically and mentally resilient.

5.4.2.6 'Covert' categories

Some animals were unaffiliated to a family group whilst others appeared in more than one. For example, kinkajous were also recognised as 'night monkeys' but, at the same time, said to be different from other monkeys. By comparison sloths were grouped separately from monkeys and yet were also labelled 'lazy monkeys'. One older person explained the link between the monkey and the sloth through the following story; "*The churuco [woolly monkey] stole the sloth's tail. So the sloth was left tailless while the churuco had its looooooong tail!"* [J. Cayetano, 70 years of age, Mocagua]. The manatee exhibits features which, according to the elderly, make it unclassifiable. Firstly, it is said to have five different types of meat; *"Manatee meat tastes like fish, cow, tapir, chicken and dolphin*". Secondly, Its physical appearance and feeding behaviour are contradictory; "*It is somewhere between animals. It eats grass like a cow. It is similar to a tapir, but swims like a fish and has no scales like a dolphin"* [Hunter, 65 years of age, San Martín]. Participants explained that animals with scales are separate from creatures with fur, feathers and claws. They did not include fish in the classification tree but described a parallel underwater world where terrestrial life is reflected; *"This [pointing at drawing] is mirrored under the water. There are two types of 'palometa' like the deer [white and red], many 'lisa' like hummingbirds and big solitary fish such as the 'pirarucu'"* [J. Cayetano, 70 years of age, Mocagua].

My results demonstrate low consensus between the ways the old and the young classify animals in Mocagua and San Martín. Whilst the elders who informed this study demonstrated a huge and in-depth knowledge about Tikuna folk taxonomy, through their descriptions of the forest and animals young adults and children did

not. Children learn a small amount from older relatives but the majority of their knowledge comes from school books and television.

5.4.3 Prey choice

As suggested in **Chapter 4** a number of foods once avoided by the Tikuna are now widely eaten in Mocagua and San Martín while other once favoured foods are now widely avoided (e.g. woolly monkey). For example children said deer was the most commonly eaten meat in their communities whilst elders said that deer were demonic and until recently not an acceptable prey [Hunter, 74 years of age, San Martín]. As well as being subject to availability people's perceptions of wildlife are changing. While cultural habits and beliefs somewhat still determine food choice in Mocagua and San Martín evidence suggests these factors are susceptible to change by creating new rules and eliminating others. This leads to changes in human-animal associations. Prey densities and alterations in the way people view wild species were assessed by examining dietary logs alongside species categorisation lists in which participants identified species according to their use [**Chapter 4**]. Food taboos and hunting restrictions were also considered. A number of those foods written in species lists did not appear in the dietary logs (71%, n=173) [underlined in **Table 5.3**] which may be related to a fall in numbers among certain species populations. These included: various large mammals, one reptile and four out of five primate species (*Alouatta spp.*, *Pithecia monachus*, *Callicebus torquatus torquatus* and *C. albifrons*) [**Appendix XVI**].

5.4.3.1 Wildlife densities

Conversations with older people from Mocagua and San Martín indicate that wild population densities of the *matamata* turtle and capybara have fallen drastically since the 1960s and are now difficult to find. Other species which are more easily hunted, such as deer, anteaters and eels, were once considered unpalatable but are becoming increasingly popular [Elders, August 2007]. Indeed, data from Maldonado [2012] show local the population densities of a number of prey species are significantly low in ANP. Of those absent from dietary records these include: the white-lipped peccary (*Tayassu pecari),* the red acouchy (*Myoprocta pratti),* the coati *(Nasua nasua)* and the South American yellow-footed tortoise (*G. denticulata*). She suggests the white-lipped peccary and coati are unsustainably harvested in Mocagua and San Martín's territories whilst the yellow-footed tortoise

is the most heavily hunted species in Mocagua. Local populations of howler and woolly monkeys are also deemed vulnerable to extinction, and the red acouchy is over hunted in San Martín [Maldonado 2012: 65-66].

Table 5.3 Number of animal species identified as food in species categorisation lists and recorded in dietary logs by participants from Mocagua and San Martín, alongside percentage values calculated from the total number of species named for each taxa in both activities [data referred to in text are underlined]

	Dietary logs		Species lists	
Taxa	no. of species	%	no. of species	%
Fish	27	45	35	55
Mammal	15	23	49	77
Bird	6	18	28	82
Reptile	2	15	11	85
Total	50	29	123	71

5.4.3.2 Species traits

Participants determined whether animal species were edible according to their physical and mental characteristics, behaviours and spiritual properties. The influence that these factors had on prey choice somewhat varied however, depending on people's circumstances and the availability of other foods. Beliefs that dictate hunting rules and control when certain animals are killed, are not followed by everyone in Mocagua and San Martín and dietary taboos are sometimes ignored. For example small prey were hunted when little else was available, and species that were renowned for tasting bad or causing illness, were also eaten on occasion. These are underlined in **Table 5.4.**

Table 5.4 Desirable and undesirable traits associated to prey animals by participants from Mocagua and San Martín in the Colombian Amazon [underlining refers to data in text]

Desirable traits	Undesirable traits
Medium to large-body size	Small-body size
Taste good	Taste bad or ugly
No taboo or negative associations	Taboo or hunting quotas do not allow it
Abundant, easy to find	Rare and difficult to find
Health benefits, strength	No additional health benefits
Will bring good fortune	Associated with ill-health or misfortune
No danger to capture or hunt	Cryptic or dangerous animals
Easy to hunt as slow or abundant	A risk to hunt
Body parts used in medicines and crafts	No use for other body parts

5.4.3.3 Dietary taboos and regulations

It is possible to determine the persistence of dietary taboos in Mocagua and San Martín by comparing principal prey items in the past with those eaten at the time of the study. To establish whether traditional beliefs or recently introduced regulations have more of an impact on food choice, or whether these decisions are made according to preference and practical considerations, the frequency of these variables were compared [**Table 5.5**]. Dietary taboos from the past were discussed during conversations with the elderly who often provided varied reasons for avoiding certain foods. For example, one hunter explained; "*I will not eat the matamata turtle because it has nails like the devil*" [Hunter, 65 years of age, San Martín], while another suggested; *"Hunters will only ever pick up a turtle on the way back from a hunting trip to avoid getting trouble from Mawachü*[35]*"* [M. del Aguila, 60 years of age, Mocagua]. These reasons were identified as food taboos based upon the animal's physical characteristics and culturally important spiritual beliefs.

Evidence suggests that only three traditional taboos are still commonly adhered to in Mocagua and San Martín [shown in italics in **Table 5.5**] while restrictions implemented by the National Park are more strictly complied with by local people. To further examine the ramifications of these influences a list of the species no longer hunted was compiled, alongside the reasons people gave for not hunting them [**Appendix XVII**]. These data suggest that some of the most well protected wild animal species are associated with traditional taboos, as well as being protected by newly enforced restrictions or the benefits they provide to the community, such as the provisioning of jobs (25%, n=20).

Table 5.5 Number of restrictions and regulations affecting prey choice in Mocagua and San Martín in the Colombian Amazon arranged into categories describing the types of variables given by people [traditional taboos still adhered to are given in italic]

	New regulations implemented by the UAESPNN	Traditional taboos no longer followed	Traditional taboos still adhered to	Factors influenced by preference or practicality
Mocagua	12	14	*2*	3
San Martín	5	12	*3*	4
Total	17	26	5	7

[35]*Mawachü* is the brother of '*Ariana*' (a female shamana), an important figure in Tikuna history and folklore associated with creation [M. del Aguila, 60 years of age, June 2007].

5.5 Discussion

5.5.1 Establishing worldviews and perceptions

A combination of people's experiences and cognitive processes create unique environmental perceptions and worldviews that often differ between cultures (e.g. the Itza' Maya of Guatemala, Atran 1994 and The !Kung bushmen of the Kalahari, Sullivan 1998). As mentioned in **section 5.1.2.1** it is proposed that while indigenous belief systems use holistic reasoning based upon life experience and intuition to understand wildlife Western cultures follow protocols devised through artificially created categories [Nisbett 2004]. Indeed, previous studies suggest that individuals from animist cultures emphasise similarities and relationships between objects where individuals from Western cultures recognise rules and formal reasoning which highlight the differences [Ji and Nisbett 2000]. Although from the same culture evidence suggests that young people and adults in Mocagua and San Martín acquire ecological knowledge through divergent processes and therefore have different worldviews and inclinations towards other species. Elders talked about traditional beliefs and folklore to describe the local classification of animal species. They demonstrated in-depth concepts derived from animism. By comparison, during activities in the school, children's ideas were much more simplified. Children of all ages failed to mention Tikuna folk taxonomy when classifying animals.

Limited time in the forest means that few young people in Mocagua and San Martín are accomplished hunters and thus experience the world in a very different way to older people in their communities. For example during group discussions elders described humans and animals as sharing spiritual and cultural dimensions, differing only in the nature of their bodies or "*the clothes that they wear*" [explained in **Chapter 4, section 4.5.1.4**]. This concept is kindled through the close interactions they experience with prey species during a hunt. Rather than choosing hunting however many young people go fishing close to the village and consequently few of them express any comprehension of the reciprocal relationships with other species that hunters so frequently spoke of [Male participant, 17 years of age, Mocagua, May 2007].

5.5.1.1 Traditional resource use and education

Traditional resource use among indigenous societies has provided examples of multifaceted efficiency [Digard 1990] however my observations suggest Tikuna children from Mocagua and San Martín learn few of the practices that make this possible. Adults from Mocagua and San Martín are more knowledgeable about the use of wildlife in traditional medicines and crafts than are children. While most women and men were able to describe the preparation of medicines, comparatively few children could explain their uses. Many of their explanations involved the detailed knowledge of certain animals' body parts. Whilst very young children may be too immature to understand complex preparation methods young people also showed limited knowledge on the topic and a general lack of interest in learning. Indeed, Gruezmacher [2008] suggests the introduction of modern medicines in the Amazonian region has caused a demise in the use of traditional medicines among the Tikuna.

As previously mentioned the majority of children in Mocagua and San Martín receive a contemporary school education. Their core beliefs are established through notions picked up in the classroom and by being exposed to conservation and tourism. Previously, the Tikuna were taught through oral practices such as storytelling and spending time in the forest [**Chapter 3**]. The types of information conveyed through these different pedagogical processes have shaped differential worldviews between the old and the young. Male hunters who share close encounters with wild prey are more familiar with their features and behaviours [Winterhalder 2001], while science and conservation based upon Western philosophies instil values and morals among young people which shape quite different environmental perceptions [Lima 1998]. Indeed Kohn [2007] among others, suggests that folkstories and walking in the forest hold prominent roles in establishing traditional beliefs and ecological knowledge.

5.5.2 Tikuna animal classifications

As suggested in hypothesis two the animal classification tree drawn by elders illustrates a number of ideas derived from TEK, and reveals stark differences between Tikuna folk taxonomy and biological categorisation according to contemporary science. For example, Tikuna folk taxonomy draws parallels between how humans and animals behave and interact socially, whereas Western

science does not. The principal characteristics used by elders to distinguish between different animals were: i) their habitat domain i.e. in which realm they reside. This dictates how they travel e.g. fly, climb, walk, crawl or swim; ii) their diet and eating habits, and whether they themselves are edible. This includes hunting behaviours and prowess; iii) their social structure, place in the hierarchy and if they travel alone or in groups. This establishes their habits and hunting strategies and; iv) their association with the spiritual realm and shamanism, which enables them to shape-shift and determines whether or not they exist as animal-persons. Indeed, Descola's [1996: 89] work showed that wider societal relations such as these are specific to animism; "*It [animism] conceptualizes a continuity between humans and non-humans, it seems to both imply and be implied, by wider societal relations of a horizontal character*".

5.5.2.1 Shape-shifting and animal-persons

Animals referred to as 'persons' are said to transcend both human and animal realms and be capable of shifting their physical form, depending on the spiritual-physical form they embody. A number of elderly participants said that decisions over resource use were once guided by consultations with *dueños* but these are no longer possible. They explained that transcendental voyages were skillfully nurtured to avoid the risk of being permanently trapped in an alternative dimension, something that lay people must not endeavour; "*The shaman acted as an intermediary between the human and spiritual realm*. O*nly the shaman could travel to another world and return safely"* [A. Panduro, 40 years of age, Mocagua]. Leanarts [2006] suggests, according to Amerindian concepts a person with a human body is seen as a prisoner of his own embodied point of view, e.g. a tapir may be trapped within a tapir form, or a deer within the body of a deer. The shaman however has the ability to transcend his current form and adopt another temporary body, freeing himself from a fixed perspective and in this way communicate with other beings. This is traditionally achieved through the ingestion of *ayahuasca*[36]*,* which enables the sensation of complete bodily disarticulation.

While it is evident from my study that intra-species communication and shape-shifting remain a real, vivid possibility amongst older people in Mocagua and San

[36] *Ayahuasca* is a brew of psychoactive decoctions prepared with the *Banisteriopsis caapi* vine mixed either with leaves from plants of the genus *Psychotria* or *Justicia pectoralis*.

Martín for most young people these ideas are inconceivable. The ability to shape-shift can be reasoned through the universal belief that every creature has an underlying causal nature or internal essence (sometimes referred to as its 'soul') which is uniquely responsible for its appearance, behaviour and characteristics [Atran *et al.* 2002; Atran *et al.* 1999; Atran 1998]. During shape-shifting the internal essence remains the same while the physical forms are interchangeable. Atran *et al.* [2002] have explained this with the biological reasoning that organisms have genotypes which are separate from their phenotypes. According to some peoples (e.g those of the Abrahamic religions) only human souls can separate from the body and are capable of union with the divine. Similarly for the Tikuna, only when an animal becomes part human in its physical form is it considered spiritually powerful.

5.5.2.2 Malign creatures and saints

Comments about jaguars, anacondas and dolphins by the Tikuna and the prominent positions of these animals in the species classification tree, express a belief among older people that these species have the capacity to shift in shape and transcend between realms. The *jacaroona,* it is said, is able to metamorphose into the pink river dolphin or *boto* [Female participant, June 2008]. The *boto* wanders the community during festivities and appears to young women as a tall white man wearing a hat and a fish as a tie. While he has the legs of a man his upper torso takes the form of a dolphin. He casts a hex on young girls to accompany him to the water's edge and then steals them away into the river [Female participant, June 2008]. Tikuna women of all ages are warned of bathing alone when the *boto* is seen swimming close by. Two elderly females shared stories about intimate encounters with pink river dolphins, while one young woman in San Martín was rumoured to have descended from the *jacaroona* because of her fair skin and pronounced upper body strength [Female participant, March 2008]. Interestingly, Lenaerts [2006: 15] describes a similar creature in Ashéninka culture called the *peyári* who is *said to*, "*[W]alk the village after the death of a person, trying to convince people to accompany him*". He writes, "*If they* [the Ashéninka] *give in to this appeal, they fall in the peyári point of view, which entails nothing but illness and death, from a human point of view"*. The *peyári*, just like the *jacaroona,* is conceived through the specific embodiment of a species with distinctive physical and behavioural characteristics.

Similar creatures feature across Amazonian and Andean mythology such as the Andean '*pishtaco'* (also known as the *kharisiri* or *ñakaq*) who is particularly relevant to Peruvian folk mythology [Canessa 2000]. According to folklore, a *pishtaco* is a stranger (often a white man) who seeks out unsuspecting locals to torture and kill them, using their body fat and flesh for nefarious cannibalistic purposes. The name '*pishtaco*' derives from the local Quechua word "*pishtay*" which means to "behead, cut the throat, or cut into slices" [Weismantel 2001]. As with many such folkstories it serves to warn indigenous peoples of white people. Specifically in this case the Andeans are forewarned of the Spanish missionaries who are said to kill people for their body fat to oil the church bells [Gow 2001]. Similarly the '*Iara'*, also spelled '*Uiara'* or *'Yara'*, is the name of a figure from Brazilian mythology based on ancient Tupi and Guaraní mythology. Its name derives from Old Tupi language meaning lady of the lake (or water queen). She is believed to be a water nymph, siren or mermaid depending upon the context of the story told about her [Lima 1999]. *Iara* appears as a beautiful young woman who sits on a rock by the river combing her hair under the sun. On sensing a man approaching the *Iara* begins to sing gently to lure him to her. Once under her spell the man leaves his village to live with her underwater [*ibid.*]. Other females who function as sirens leading men to their death exist in numerous folktales across the Americas [López 2006] and similar to the *jacaroona,* and the *curupira* [**section 5.4.2.3**] physical deformity is a common theme, usually associated to the feet. For example, the Native American 'Deer Woman' [Dunn 2003] has hooves for feet, the vampire-like South American *'La Patasola*' has just one foot [Hellman and Hall 2012], while *'La Llorona*' from Mexican folklore is said to have no feet [Sloan 2008].

According to Tikuna folk taxonomy some animals are so likened to humans they are not considered animals despite their physical forms. For example the elders explained that '*Ariana'* (the spiritual form of the hummingbird) was not included in their diagram as she is a person [Female participant, 80 years of age, San Martín]. "*Ariana was a shamana (a female shaman) who wanted to cut the hair of the sun, so she changed into a hummingbird so that she could fly quickly and dart to the sun's rays. When she reached the sun she cut off one of its burning rays with her beak, scalding her face and dying. She fell into the water below where her brother Mawachü later found her. He took the sun's ray from her beak"* [J. Cayetano, 70

years of age, Mocagua]. Some participants spoke of hummingbirds as being saints travelling between worlds and playing a significant role in the creation of the Tikuna people [Male participant, 62 years of age, San Martín]. Indeed, Carneiro's book 'The Origin of Myths' [2000] associates similar stories to the hummingbird; "*The Tikuna people of the Upper Amazon, tell that all the peoples were once a single tribe, speaking the same language until two hummingbird eggs were eaten, it is not told by whom. Subsequently the tribe split into groups and dispersed far and wide*".

5.5.2.3 The relevance of ambiguity

Elders explained that a single species exists in multiple types within one family, and one species is sometimes categorised across multiple groupings. For example, participants distinguished between two types of *Aotus* monkey (the demonic red-chested *buri buri* and the 'real' white-chested night monkey) while the '*tigre segundo*' (secondary jaguar) was said to have visible defects in its markings which easily distinguished it from the three other forms of jaguar; "*It has a swirl by the top of the tail which makes its skin different*" [R. Santos, 73 years of age, San Martín]. The elders explained the description *segundo* was given to the 'secondary' jaguar following the lower price fetched by its skin during the fur trade. The painted tapir also takes multiple physical forms. The demonic *imi imi* has a leg which is a stump and makes a distinctive "thud" when he walks to warn people of his approach, whereas *cenawā* has long nails and long black hair. Like the *curupira* [**section 5.4.2.3**] he also leaves tracks in the forest to confuse hunters and fool them into losing their way.

Despite the blurred boundaries between humans and animals Tikuna folklore paradoxically also makes distinctions between humans and animals. In San Martín one hunter said, "*Humans are different to other animals, because we were born from soft teeth (of animals) thrown into the river by Yoi and Ipi*[37]*. All other animals were born from hard teeth (of animals)*". These ideas distinguish between 'real' edible animals (with hard teeth) and animal-persons (with soft teeth). The prefix '*propio*' which indicates the animal's 'real' or 'actual' form is a commonly used linguistic marking among humans. Indeed Berlin [1973] showed that when greater precision of designation is desired people use binomial designation linguistic

[37] Yoi and Ipi were the first Tikunas and sons of Nüputa.

markings through the addition of attributive qualities such as ‘true’, ‘real’ or ‘genuine’. Animals that do not fit a specific category according to Tikuna folk taxonomy typically possess complex traits or behaviours. Structural studies of classification have suggested that the rarity of intermediate categories in traditional ecological groupings deem them critical to grasping folktaxonomic classifications (e.g. the Tetzel, Berlin 1973). Likewise, the ambiguity of Tikuna animal classifications demonstrates the interconnectivity between humans and other species, which is a key element of the Tikuna belief system.

5.5.2.4 Animals in folktales

Folklore and folktales are central to the way elders in Mocagua and San Martín classify animals. For example, an older woman explained; *“Any bird who flies alone has a big family but chooses to live on its own. That is because it used to be the tatatao before Ipi and Yoi hit her with a stick. The impact of their blow broke her up into a thousand pieces and each one transformed into a smaller bird”* [Female participant, 65 years of age, Mocagua]. Several of the stories recorded with elderly informants disclose multiple messages about human-animal sociality and people’s interactions with the environment. The following dialogue teaches the listener social rules and ethical morals between human and animal conspecifics, and warns Tikuna women about the consequences of infidelity;

“Once there was a woman who told her husband to go hunting while she went to the chagra to collect plantain and manioc. Everyday she told him the same thing, “Husband. Go and fetch me more meat. We don’t have enough. I will collect manioc from the chagra”. One day he decided to follow her to the chagra, and secretly watched her from behind a bush. After some hours a white man appeared wearing smart clothes and a hat. He watched as his wife caressed the man and fell asleep in his lap. The husband was furious. He waited until she had left and then followed the white man to a tree. There he saw the white man transform into a giant worm. He attacked and killed the worm and wrapped it up in leaves as if it were fresh prey. He then took the meat home to his wife and told her to cook what he had brought. The wife unwrapped the huge ugly worm and screamed at her husband; “Why did you bring me this?!!” Her husband replied, “This is your lover, Why are you scared of him?” With that he left his wife who continued sobbing in the hammock until she died of sadness just a few days later” [Male participant, 53 years of age, San Martín].

The dispositions, traits and personalities of animals are also explained through folkstories and seem to take priority over their physical appearances. Animals are described as being "*strong, clever, dangerous, intelligent, witty, stupid, comical and angry"*. Many of the names given to them are associated with their behavioural characteristics. For example the black tamarin monkey *(Saguinus niger)* is known locally as *'bebe leche'.* One hunter explained, "*This means 'to drink milk' and refers to the tamarin's white moustache which gives the impression it has milk around its mouth"* [Male participant, December 2008]. Primates are often described as quick-witted, intelligent creatures who frequently play pranks on other species. The story of the woolly monkey provides one example;

"*Once there was a woman who went into the forest to collect surba[38]. In the forest she met a handsome 'churuco'[39] who told her to follow him and he would take her to feed on more delicious fruit. As the monkey led her deeper into the forest the woman soon realised she was lost. The monkey gave her many more surba to eat and she climbed into the trees and became part of his family. The woman married the churuco and stayed in the forest forever never returning to her village again"* [J. Cayetano, 70 years of age, Mocagua].

The social behaviours of animals are convincingly portrayed through stories such as those shared by elders during the study, and animals with human characteristics and those that transform partly or fully into animal-persons are nearly always at the forefront. Some stories expand on this and teach the listener about the anatomy of wildlife, in this way transferring TEK between generations. According to '*The story of the sapo walo'* a hunter was tricked into marrying a toad which he believed to be a woman. When he took her to bed to consummate the marriage he soon discovered she had no genitalia and was, in fact, a toad rather than a woman as he had been led to believe [J. Cayetano, March 2007]. This story teaches the listener about the toad's cloaca[40] instead of the visible sexual organs typical to most mammals.

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[38] *Surba* is a sweet forest fruit with a white sticky pith known to be a favourite among woolly monkeys.

[39] *Churuco* is the local name for woolly monkey.

[40] In zoological anatomy, a *cloaca* is the posterior opening that serves as the only opening for the intestinal, reproductive, and urinary tracts of certain animal species. All amphibians, birds, reptiles, and monotremes possess this orifice, from which they excrete both urine and feces, unlike most placental mammals, which have two or three separate orifices for evacuation.

5.5.2.5 Cultural norms and hunting ethics

Hunting and eating prey are a central theme to Tikuna folklore. Most of these stories prescribe dietary taboos and hunting ethics which contribute to a number of human-animal relationships. For example the following two stories convey to the listener the ramifications of over hunting;

"There was once a young man who loved to kill wild pigs. He would go into the forest and kill 40 or 50, or 100 at one time. One day, when he went into the forest he came across a beautiful woman. She was the dueño of the wild pigs, who had transformed into a woman to enchant him. She told him not to kill wild pigs anymore as he was killing her family. Her brothers, sisters, aunts, uncles, cousins and parents but he ignored her. In retribution the dueño turned the man into a wild pig and he could never return home" [Male participant, 70 years of age, San Martín].

"*Once there was a Tikuna who hunted 'cotudos'*[41] *every day until one day the dueño of the cotudos got angry. The next time he went to the forest the dueño appeared to him as a human and asked what he was doing. He replied: "I am hunting cotudo". The dueño took the hunter to his home inside a tree and tied him up. He left him there until he nearly died. Then he released him and warned him not to hunt any more cotudos or he would punish him again. From that day on the hunter never killed a single cotudo*" [Male participant, February 2008].

5.5.2.6 Morals shared through folkstories

An important aspect of traditional storytelling is to teach children about the social and cultural rules that guide people's behaviours towards animals and each other. Folkstories illustrate how certain values determine the choices we make and the consequences of those decisions. The moral values and beliefs of the narrator are inherently reflected through their interpretation of the tale [Rosenberg 1997] therefore many versions of the same tale exist. This is what makes them unique and distinct to learning from textbooks. Indeed, Lévi-Strauss and Willis [1987] claimed that, "*It is not the narrative or the symbolic interpretation that creates meaning but how the pieces are combined*". Folkstories evolve with changing cultural and socio-economic circumstances and conversely, contribute towards the transformation of cultural and traditional belief systems themselves. Descola's 1996 publication showed how indigenous societies used metaphors through

[41] *Cotudo i*s the local name for howler monkey.

mythology and folklore that attributed human dispositions and social characteristics to nonhuman creatures. Indeed, Tikuna folkstories play a vital role in establishing such beliefs as well as serving an educational role about biological and environmental processes, such as the amphibian reproductive system [**section 5.5.2.4**]. A breakdown in transmission of TEK from the elderly to the young in Mocagua and San Martín, however, has seen these concepts being rapidly replaced by Western notions and philosophies.

5.5.3 Basic-level naming and descriptions

Findings from this study show that children in Mocagua and San Martín are developing a less attuned perception of the forest than generations before them did because of an absence of certain environmental and cultural cues. Indeed, Medin and Atran [2004: 11] suggest that people's minds develop in a manner acclimatised to their natural surroundings, dependent on a number of environmental, social and cultural factors. They maintain the full expression of the 'folkbiology module' requires environmental triggers alongside cultural prompts, both of which are lacking among certain industrialised societies and individuals who spend little time in nature. Other studies suggest these conditions generate anthropocentric ideals without regard for animals or nature. In urban areas and places where nature is limited children are estranged from wildlife and view it as something which they are separate from. Medin and Atran [2004: 13] write, "*Humans serve as a prototype among young children when distinguishing the world around them where human beings are the only biological entity that young urban children are familiar about*".

Research has shown that perceptual learning plays a major part in people's ability to classify and understand nature. Our recognition and understanding of what we see and experience is determined by the perceptual and conceptual modules in the brain [Goldstone 1998; Johnson and Mervis 1997; Schyns and Rodet 1997]. While the perceptual module is quick acting and interprets colour and facial recognition [Raftopoulos 2001] information is supplied to the conceptual module by the sensory receptors and nervous system [Boster 1987]. Most individuals are more attuned to one module than the other and this varies over time. For example, several publications propose that the learning of 'basic-level' animal classifications are the first distinctions learnt by children during their early years using the

perceptual module, and this is what creates their initial perceptions of the environment [Waxman and Markow 1995]. By comparison 'typicality' which exhibits the qualities, traits and characteristics of animals is developed later on in life once the conceptual module is more developed [Rosch and Mervis 1975]. In understanding how this information is acquired and processed in the human brain we can further appreciate the relevance of lived experience and environmental cues to the embodiment of people's ideas about wildlife during crucial development processes.

5.5.3.1 Folklore and schooling

The impact of school education on children's knowledge differs between boys and girls in Mocagua and San Martín. This was reflected in the lists they wrote during species categorisation tasks, with girls naming a much higher number of animals associated with Tikuna folklore than boys [refer to **section 5.4.1.1**]. The girls' knowledge appeared to reflect the stories they had learnt from a textbook at school, designed to teach indigenous children about Tikuna heritage and folklore. Although boys and girls had equal access to this resource it seems that the girls learnt more from the book than did the boys. Indeed, my observations in the school support this suggestion. During lessons boys found it difficult to be seated and concentrate for more than half an hour at a time indicating the confines of the classroom as an unsuitable learning environment. Other studies have shown that individuals' attention spans vary with age and gender, and depend largely upon the environment, their tendency to listen and how interested they are in the subject [Catald and KewalRamani 2009]. Guevremont [1992] found that girls aged between 6-14 years were typically more studious than boys of the same age and suggested the classroom was an unsuitable environment for some children to learn in. These factors not only influence the way knowledge is learnt but also the depth of information acquired. While elders learnt about the social and spiritual values of wildlife by listening to stories as children many of the messages conveyed through folkstories are not passed on to Tikuna children. Whilst more research needs to be done on this in Mocagua and San Martín, my initial observations suggest similar ideas to those echoed in the work of Medin and Atran [2004] and other anthropological texts [Lima 1999; Rival 1998].

5.5.3.2 Knowledge transmission

While a person's age influences their depth of understanding, the way knowledge is transmitted also has an impact [Boster 1987]. Language plays an integral role in the transmission of TEK, traditional folklore and how people form their perceptions of animals. For example, Tikuna notions about the world identify connections and relationships between living things and the environment and this is reflected through their indigenous language and the telling of folkstories. Furthermore, it is proposed that the use of language is particularly influential in shaping people's perceptions of their environment where more than one vocabulary is used, as is the case among people in Mocagua and San Martín where both Spanish and Tikuna are spoken. Epistemological processes that convey lessons about connections and relationships encourage children to develop an awareness and sensitivity towards other species and support human-animal sociality [Carneiro 2000]. Lessons learnt through storytelling typically take the form of convoluted messages that focus on relationships (i.e. the 'plot') rather than subject, guiding the listener through a series of actions and reactions as the story unfolds. During folkstories, the narrator engages the listener and is able to animate certain aspects of the story to enhance the listener's comprehension through tonal expressions and actions [Rosenberg 1997].

The study of syntax[42] has shown that when people learn a second language, depending on when it is acquired this influences their thinking processes with varying permanence [Nisbett 2004]. Indeed, classifications and concepts of the world that adopt a substantially Westernised way of thinking are established through the Spanish language whereas the Tikuna language facilitates more holistic notions derived from an animist belief system. While children in San Martín are compound bilinguals (speaking both Tikuna and Spanish from birth) some adults and the elderly in both communities are coordinate bilinguals, the majority of whom learn Spanish later on in life. Nisbett [2004] suggests coordinate bilinguals who adopt a second language during adulthood are confined to speaking a newly learnt dialect in limited situations as they continue to understand the world according to conceptualis-ations created through their native language. Compound bilinguals by comparison learn to contextualise events in both

[42] The study of principles and processes by which sentences are constructed in particular languages [Chomsky 1959].

languages and express fused mental representations of the world [Nisbett 2004]. Indeed, in Mocagua and San Martín these variations appear to affect the way participants perceive their environment depending on their conceptualisations of the world and from where they derived.

There was evidence in Mocagua and San Martín that information acquired through religious and academic teachings have shaped people's perceptions of the environment and how they characterise animals. For example some people said the main distinguishing feature between humans and monkeys is that monkeys have tails *and* no religious denomination. One man said; "*I have thought sometimes, that we are similar to monkeys…we have eyes at the front, hands with five fingers…but we are different. We haven't got a tail, and we are Christians*" [J. Llereno, 52 years of age, Mocagua, February 2009]. This comment demonstrates how Christianity also plays a role in how the Tikuna think about wild animals. Some adults' perceptions of animals were influenced by scientific knowledge, having picked ideas up through their work with researchers. For example one man said; "*We call the chosna 'mico nocturnal' but a researcher told me that although it's like a monkey it's not actually a monkey because it's not agile. Monkeys live, eat and sleep in the air. You see them jumping from tree to tree, eating fruits. They can keep moving quickly and don't need to rest. The chosna gets tired quickly and has to rest. They feed in the trees but you see them resting in the lianes. It is more closely related to a mink*" [J. Llereno, 52 years of age, Mocagua].

5.5.4 Taboos and local strategies

Taboos represent unwritten social rules and serve to regulate human behaviour and social practices that widely contribute towards people's perceptions of other species, by constructing local belief systems and cultural norms [Parathian and Maldonado 2010]. They have been recognised as a strategy to prevent the overexploitation of terrestrial and aquatic animals among many societies [Johannes 1993; Chapman 1985] and as a way of managing nature by traditional peoples [Sankhala 1993; Begossi 1992; Chapman 1985; Kwapena 1984; Sarkar 1984; Reichel-Dolmatoff 1976]. Indeed, several studies suggest pressure on target resources are greatly reduced as a result of traditional taboos [Berkes *et al.* 2000; Gadgil *et al.* 1993; Johannes 1993; Gadgil 1987; Chapman 1985].

Two types of food taboos are employed in different ways to fulfill specific roles in society [Ross *et al*. 1978]. These are: i) restrictions for specific consumer groups or during certain stages of life and ii) general taboos that tend to be species specific and create dietary regulations across entire communities [Whitehead 2000]. People in Mocagua and San Martín explained that women must not eat pirana fish during menstruation nor tortoise meat when pregnant [A. Panduro, March 2007]. This was evidenced when comparisons were made between the diets of the elderly and the young. A number of dietary restrictions stipulated what people would hunt in Mocagua and San Martín however my data suggest the authority of specific taboos varied depending on people's beliefs, their role in society and the way they perceived other animals. Indeed, Simoons [1998] has suggested that while belief systems are the causal factors behind food restrictions, these change according to environmental and social requirements and necessities.

Alongside traditional cultural constraints people in Mocagua and San Martín also spoke about the introduction of new regulations, such as a ban on hunting woolly monkeys in Mocagua. Evidence suggests a number of food taboos that were once strictly adhered to among the Tikuna have been replaced with new restrictions on what may and may not be eaten. The tapir, deer and night monkey are examples of species that were once widely avoided but are now eaten. In addition, the giant anteater, red-nosed tree rat, ocelot and various bird species were recorded in dietary logs despite not being identified as suitable food items during written exercises. Stingrays were only ever observed being eaten by groups of men during hunting excursions. Indeed, participants said the stingray is not typical prey for the Tikuna; "*Stingray was not something that our ancestors would have eaten, but now we eat it when we can, usually when we are away from the village on a hunting trip*" [Male participant, April 2008].

People gave several reasons as to why certain taboos had been lifted based upon traditional beliefs and decisions because of changes to environmental conditions. For example one hunter explained; "*Deer were once human. It was very dangerous to eat them as they were demons. Now it is safe for us to eat them*" [A. Vasquez, 71 years of age, San Martín], while another person remarked; *"Sometimes you have to try different meat as there is nothing else. It's good. I like*

giant anteater" [Male participant, 65 years of age, Mocagua]. Others expressed concern or repulsion over the consumption of deer and tamandua but admitted they had eaten these meats when there was nothing else available [Male participant, 76 years of age, San Martín]. McDonald [1977] showed that taboos exist as a result of trial-and-error processes carried out by people who manage their landscapes in response to local conditions. These vary through space and time, i.e the number of taboos implemented by indigenous people may increase once the local environment begins to be less productive [Holling 1978] or, as is the case in ANP, people become less particular about what they hunt when food choice is limited.

5.5.4.1 The jaguar

Of all the evidence collected over the course of the study highlighting differences between the old and the young perhaps the most telling was a single observation of people's attitudes towards the jaguar. On one occasion during the study an ocelot (referred to as a 'small jaguar' by local people) was spotted on the outskirts of San Martín. It was shot and the body disposed of in the forest. As the animal was carried away from the community I observed children being held back to stop them from getting close to the carcass. Only the young people who had shot the ocelot dared handle it. Further conversations with people confirmed a common belief that all jaguars (including jaguars, ocelots and cougars) transmit diseases to people, but it was only the elderly however, who refused to get close to the animal.

Through conversations following on from this experience a number of older people told me that the jaguar was a shaman and the young people who touched the animal did so because they did not know any better. While the elderly designated power and sorcery to the jaguar, and still strictly adhere to taboos about not eating its meat, some young hunters did not. Furthermore they showed little fear towards the animal; "*You can easily see them coming and shoot them from a distance. Snakes on the other hand can bite you without knowing they are there*" [Young person, 17 years of age, San Martín]. These comments were validated through conversations with other researchers and local residents in ANP who said; "*In the past the Tikuna would never have eaten jaguar meat, but now young people will hunt and eat the animal. Most elders will still not touch it"* [A. Barona, ethnobotanist and ex-employee of ANP, December 2012]. The views shared

among young people in Mocagua and San Martín about the jaguar may have consequential effects on re-establishing the animal's population success following it's earlier demise after the fur trade.

5.6 Conclusions

- Differences exist in the ways children and adults in Mocagua and San Martín perceive and categorise animals implying disparities in their knowledge about wildlife.
- Education received by school children influences the knowledge they acquire but this is also dependent upon a number of environmental, social and cognitive variables.
- Participants of different ages have different attitudes towards hunting and fishing with young people showing a preference towards fishing where they do not possess the skills needed to go hunting.
- Tikuna folk taxonomy differs from Western species classification. It not only refers to the physical characteristics and behaviours of animals but also looks at their habitat domain, inter-species relationships and draws parallels with the Tikuna kinship systems.
- The species classification tree described by elders from Mocagua and San Martín reflect the hierarchical and social structure of the Tikuna, with animals identified as shamans, leaders, protectors, advisors, messengers and hunters.
- The significance of 'covert' categories in the Tikuna animal classification system establishes that indigenous folk taxonomy does not fit fixed structures.
- Animals' traits determine their recognition by local people as suitable prey. Among other things edible species are distinguished from 'animal-persons' that cannot be eaten while certain animals are eaten by some individuals and avoided by others.
- Local people's perceptions of animals influence their prey choice. These are interchangeable and influenced by availability, personal choice, social norms and cultural practices.
- Those animals protected by both traditional taboos and tourism or conservation are the least likely species to be hunted for prey by local people in Mocagua and San Martín.

Chapter 6

The impact of outside intervention

Chapter 6: The impact of outside intervention

6.1 Introduction

The previous chapters have provided evidence that modifications in cultural, social and environmental conditions cause people's perceptions of wildlife and human-animal interactions in Mocagua and San Martín to change. To overcome the issues caused by habitat destruction and a decline in wildlife populations innovations such as ecotourism, research and conservation are implemented in ANP. As previously suggested the introduction of such intervention has altered the relationships and exchanges between people and wildlife through a disregard for reciprocity, local beliefs and traditional practices which previously connected people to nature. In this chapter the impact of these strategies on local people's perceptions of sympatric wildlife is explored.

6.1.1 Biocultural landscapes and conservation

The results from this study have shown that modifications in socio-economic and biocultural conditions, brought about through sedentarianisation and exploitative resource extraction, have forced people in Mocagua and San Martín to adjust their relationship with nature. It has been determined that hunting, even at a local level, is detrimental to wild animal populations in ANP [Maldonado 2012]. As unsustainable conditions arise people seek new livelihood strategies and look to alternative ways of acquiring food and surviving. Tourism, conservation and research have been implemented in ANP as an attempt to contribute towards sustainable environmental, social and economic circumstances. Evidence in **Chapter 3** however proposes that these factors degrade traditional belief systems and cause a breakdown in the Tikuna's socialisation with other species.

Along with the apparent decline in TEK, folklore and traditional beliefs in Mocagua and San Martín, a number of dietary taboos have been replaced by regulations, implemented either by the UAESPNN, local NGOs and tour operators or by the communities themselves, under advice from researchers and conservationists. This has had ramifications on young people's attitudes towards wildlife, the practices they carry out as adults, their decisions over resource use, and their

involvement in and support for conservation, research and tourism. Indeed, the effects on children and young people who have been exposed to conservation and development from a young age were observed in Mocagua and San Martín during the study [**Chapter's 4** and **5**]. Many children were unfamiliar with the skills and knowledge required to make traditional medicines and crafts. Few young people went hunting and most expressed an interest in leaving their communities to migrate to the city.

6.1.1.1 Ecotourism and local communities

It has been suggested that conservation and tourism are potential solutions to socio-economic, environmental and development issues whilst ecotourism, has the potential to foster transformations in ecological consciousness vital to achieving more sustainable human-environment relationships [Higgins-Desbiolles 2009]. Indeed, indigenous participation in ecotourism is prescribed as a conservation strategy globally. From 1988 to 2003 The US Agency for International Development (USAID) funded 105 projects that involved an ecotourism component [Kiss 2004]. Zeppel [2006] proposes that, "*Traditional peoples have been frequently associated with ecotourism because of the 'strong bond between indigenous cultures and the natural environment. There are examples from around the world where indigenous communities have made use of the opportunities that ecotourism provides to educate non-indigenous people about their values and lifeways"*.

On paper, ecotourism combines conservation and tourism, whilst supporting environmental, social and financial benefits in the form of 'green economic development'. However, while some positive examples exist, they are in the minority [Verner 2009]. Where ecotourism has assisted local communities whose traditions are in decline by bringing a process of cultural revitalisation, if implemented without appropriate cultural sensitivity, rather than helping, ecotourism can have adverse effects on local environmental, socio-cultural and economic conditions. Indeed, Verner [2009], Fennell [2008] and Townsend [2003] provide evidence to suggest that indigenous tourism can be of little benefit to local people and wildlife, and that successful ecotourism projects are difficult to find.

West [2006] suggests success is often limited because of inadequate access to financial capital, insufficient or inappropriate practical support for local people and disputes over resource use and management practices. Other major factors in ANP have been identified as "*poor communication*" and "*the misrepresentation of local realities*" [Ungar and Strand 2012], while some older people in Mocagua and San Martín believe that outside intervention of all kinds creates a divide between humans and nature through the commodification of wildlife and a loss of TEK [**Chapter 3**]. Indeed, Sullivan [2008] maintains that tourism does little more than segregate indigenous societies from their traditional identity (e.g. The !Kung bushmen of the Kalahari) while West [2006] shows how local people have lost access to their territories and received minimal benefits through conservation. The impact of outside intervention on environmental perceptions among the young is particularly prevalent [Moscardo *et al.* 2004; Allen et al. 1988]. Some children in Mocagua and San Martín have developed a number of ideas taught to them through environmental education and information disseminated by researchers and conservationists. Moreover, in Mocagua especially, children and young people have become acquainted with the firsthand economic benefits of tourism and research as their parents earn salaries from these ventures.

As established in **Chapter 1** [**section 1.6.5**] San Martín and Mocagua are situated in contrasting locations which means that people are differently exposed to tourism, conservation and research. This contributes towards distinct environmental and socio-economic conditions which provide unique circumstances under which to make systematic comparisons between the two communities. Mocagua is located next to the ANP tourist lodge and research centre while San Martín is more isolated from the main hub of the Park's activities. Mocagua's inhabitants have frequent contact with visitors and increased access to jobs. For people in San Martín such opportunities however are rare. Differences in the ways people categorise wildlife and perceive nature, as well as their opinions of conservation, tourism and research are therefore to be expected. Some diversity in local people's approaches to livelihood strategies is also predicted among families in Mocagua and San Martín, depending on their location, interests, skills, morals, cultural belief system and economic solvency.

6.1.1.2 Livelihoods and economic resources

Local peopled who are employed by ANP work long hours and receive a monthly salary. For Mocagua's residents, a number of whom work at the Park, jobs in tourism somewhat replace subsistence activities such as growing food and making handicrafts. Where job opportunities are less frequent in San Martín, many people's livelihoods are still based on collective work with a reliance on forest resources, products from their allotments and selling artisan goods. As established in **Chapter 4** people's access to certain foods are highly dependent upon their income. Indeed, as well as a lack of skills and knowledge Gruezmacher [2008] suggests that the successful rearing of domestic animals in Mocagua and San Martín is limited due to the financial resources required in order to care well for livestock.

Reports suggest that the inhabitants of San Martín have endeavoured to preserve their indigenous identity more than any other community in ANP [Gruezmacher 2008]. This factor, alongside the current conflict between community members caused by unequal opportunities to find employment, confirmed the community's decision to ban research in their territory in 2009 [**Chapter 1, section 1.6.3**]. In 2007 people from San Martín requested financial assistance from the UAESPNN to construct a *maloca* in their village. It was to be used as a communal space for ceremonies, social gatherings and storytelling as well as being part of a proposed initiative to draw tourists to the community, offering the experience of sleeping in a hammock and spending the night in a traditional communal roundhouse. Few tourists came to the community however and many people believed this was because of a lack of effort by the UAESPNN and tour companies. The ban on research reflected a feeling of mistrust towards 'white' officials among community members, as San Martín's *Curaca* endorsed the decision under the premise that non-local people "*rob the community of their culture*". This was backed up through comments by people in favour of the Curaca's decision including, "*Researchers benefit unfairly from indigenous knowledge and skills*" [Male participant, community meeting, May 2008]. While it was declared that new research should be banned from taking place in San Martín, the only foreigners that were welcomed into the community were paying tourists. I attended the meetings in San Martín where discussions took place between community members. While the majority of people in the community voted against this decision, with the opinion

that banning research would simply further limit their opportunities for paid work, the decision was dominated by individuals from families with a recognisably high status. Research is still welcomed in Mocagua and the community has formed a strong relationship with the Park. During her study of local livelihoods in ANP Gruezmacher [2008] identified that strategies in ANP are often structured by institutional factors and regulations imposed by the National Park. This, she suggests makes the management of resources largely inaccessible to local people and consequently influences human-wildlife interactions in the two communities [*ibid.*].

6.2 Hypotheses

The following hypotheses are explored to compare the impact that outside intervention and economic resources have on human-animal interactions in Mocagua and San Martín:

i) As environmental conditions deteriorate and fewer natural resources are available in local communities, people establish different relationships with wildlife and adopt alternative livelihood strategies.

ii) Where local people have access to jobs in research and tourism they have less time to hunt, fish and grow food. Precedence is placed upon the commodification of wildlife through these activities, however where these opportunities are limited alternative initiatives are developed.

iii) Conservation, research and tourism have positive and negative effects on local communities and wildlife in ANP, therefore local people have mixed views about these practices. People's attitudes depend upon their personal experiences, environmental perceptions and socio-economic circumstances.

6.3 Methods

6.3.1 Species lists and diet

Disparities between the ways in which people in Mocagua and San Martín categorise and classify animals were examined using quantitative and qualitative methods. These data were analysed to determine the effects of varying environmental and economic conditions. The number of animals named in species lists during workshops, generated by participants from each of the two communities, were compared and converted into percentages. Percentage values were calculated by dividing the number of species named by each community, for each of the six categories (food, pets, medicine, arts and crafts, tourism and folklore), by the total number of species named for that category by both communities. Differences in prey choice between people from Mocagua and San Martín were calculated by comparing the dietary logs recorded by women across participating households. The number of meals consumed by each family containing meat or fish were totalled for each community, as well as the number of meals that people ate containing no animal protein. These values are presented as percentages of the total number of meals eaten by both communities containing meat, fish or no animal protein, respectively.

The amount of domestic, wild and bought meat consumed in Mocagua and San Martín was calculated for each community, by adding up the total number of meals each family ate containing domestic, wild or bought meat. The amount and type of prey eaten were compared in the same way. These data were then tested for significance. In addition, the frequency that local practices were carried out and people's economic solvency were compared between the two locations. It was assumed that the more bushmeat and fish people ate the more frequently they went hunting and fishing or the more money they had, as they could buy it from other people. Those families who consumed domestic meat most frequently were also assumed to have increased access to money, either to rear animals or to buy meat from the shops or from others who kept livestock in the community.

6.3.2 Participant-led discussion, interviews and PFM

Data collected through conversations, semi-structured interviews and PFM were analysed to examine the importance of wildlife to local people and their attitudes towards tourism, conservation and research. The topics that were discussed during participant-led discussions were grouped into categories and calculated as percentages from the total number of conversations that took place with informants through the course of the study. Finally, the types of films made by each community were compared to determine those topics of most relevance to local people in Mocagua and in San Martín.

6.3.3 Observations

Observational data were collected to examine people's daily activities in the communities and incorporated into the results to support quantitative data. These data were further validated through the examination of specific case studies from each community based upon information acquired during time spent living with host families in 2007 and 2008. Further details of the methods used are provided in **Chapter 2**.

6.4 Results

6.4.1 Community comparisons

It is suggested that ecological knowledge and people's perceptions of wildlife vary from place to place as a result of the ways in which individuals respond to environmental and economic changes [**Chapter 5**]. Therefore differences were expected in the way that people from Mocagua and San Martín categorised animal species according to their uses.

6.4.1.1 Species lists

The number of animals named in species lists by people from Mocagua and San Martín were similar for both communities (Kruskal–Wallis test, corrected for tied-ranks H=1.9, df=1, p=0.163). This indicates some continuity in the way that people categorised animals. People from San Martín named 92% of the total number of different species identified by both communities, while people from Mocagua named 89% of these (n=471). Moreover participants from Mocagua and San Martín showed relatively similar patterns in the compositions of their species lists for each of the six categories (U=13, n=924, p>0.05, Mann-Whitney U-test) [**Figures 6.1** and **6.2**]. The main discrepancy in the way the communities categorised species was that significantly more animals were named for tourism by people from Mocagua than were named by people from San Martín (χ^2=10.782, n=101, df=1, p=0.001) [underlined in **Table 6.1**]. Of the 87 animal species listed under 'tourism' people from San Martín identified only 38% [underlined in **Appendix XVIII**].

Table 6.1 Number of animal species lists for six reference categories generated by participants from Mocagua and San Martín in the Colombian Amazon [underlining indicates data referred to in text]

Category	Mocagua	San Martín
Food	141	141
Pets	128	103
Folklore	101	72
Tourism	68	33
Arts and crafts	57	51
Medicine	42	34
Total	537	434

6.4.1.2 Conservation

People's involvement in conservation has varying effects on how they value wildlife and which animals they consider suitable as prey in Mocagua and San Martín. A consistently high number of animal species were identified as food in both communities although there were variations in the types of animals they named. For example five species of primate were identified as prey in San Martín but not in Mocagua. While howler and woolly monkeys were present in the lists generated by both communities, saki monkeys (*Pithecia monachus)*, squirrel monkeys (*Saimiri sciureus)*, titi monkeys (*Callicebus torquatus lucifer),* tamarins and capuchins were also recognised as prey in San Martín [underlined in **Appendix XIX**]. Qualitative evidence supports implications that these differences have been strongly influenced by Mocagua's involvement in primate conservation. A number of resident's from Mocagua said they would no longer hunt primates because of low primate densities alongside long-term conservation efforts encouraging people to stop hunting them, and the range of benefits they secured through work as wildlife guides and for tour companies. Local guides in Mocagua commented that woolly monkeys were becoming particularly difficult to find and that they had to travel increasingly far to locate monkeys when they were guiding tourists and researchers [Male participants, May 2007-June 2009]. This was cause for frustration among some people who relied on locating groups of primates for the long-term success of their jobs in research or tourism.

People's comments also supported the assumption that local residents' views about the importance of wildlife varied between communities. For example, in San Martín several people said that certain prey were becoming increasingly difficult to find during hunting expeditions; "*For me it is very sad that I didn't find any animals on this trail. Five years ago there were woolly monkeys, wild pigs and agouti here"* [J. Sanchez, May 2008], while people in Mocagua spoke about the need to protect wildlife to support the work of conservationists and secure jobs with researchers. Young people in Mocagua seemed particularly concerned about ensuring that these opportunities are available to them when they are older; "*It is important that we protect primates as there are only a few remaining. If we look after the environment then when we are older we can also find work at The Animal House or with researchers instead of hunting"* [Animal carer, 21, Mocagua]. An adult from Mocagua explained, "*Only some people hunt now, and even fewer have*

time to work in their chagras. Most families buy the things they need instead so it's important we have enough money to do this" [F. de Aguila, August 2007]. By comparison people in San Martín expressed little incentive to change their lifestyle in the way that people in Mocagua have done, as work opportunities are far fewer.

6.4.1.3 The benefits of tourism

While statistical tests indicated some homogeneity between quantitative data sets generated from Mocagua and San Martín, conversations with people highlighted the differences between the ways in which animals were perceived in the two communities. Participant-led discussions confirmed that people from Mocagua were more likely to talk about tourism in relation to the importance of wildlife than were people from San Martín. Indeed 87% of conversations that focused on tourism occurred with people from Mocagua (n=23) [underlined in **Table 6.2**]. It also became evident during the study that most young people in Mocagua saw tourism as a positive influence in their community [**Chapter 3**]. One young girl said, "*Tourism provides jobs so we can buy food and people don't have to kill any more monkeys"* [Female participant, 8 years of age, Mocagua]. While another child commented, "*We have to look after the things the tourists like then they will keep coming and we can have jobs too"* [Female participant, 11 years of age, Mocagua].

This information supports data generated through species lists which showed that people in Mocagua more frequently recognised the importance of wildlife for the economic benefits it generated through tourism, compared to San Martín's residents. Observations in the community further support these suggestions. Ninety percent of families in Mocagua see the financial benefits of jobs provided through tourism and it would appear that children in Mocagua have become accustomed to the lifestyle this provides. By comparison less than 20% of families in San Martín have found work in tourism. Instead most people in San Martín earn money through the sale of handicrafts and the local trade of bushmeat with other villagers.

Table 6.2 Number of participant-led conversations that took place in Mocagua and San Martín during June 2007-July 2009 [underlining indicates data referred to in text]

	Category						
	Food	Pet-keeping	Tourism	Medicine	Arts	Folklore	Totals
Mocagua	22	9	19	4	3	25	82
San Martín	19	6	4	7	3	36	75
Total	41	15	23	12	6	61	157

6.4.1.4 Local knowledge transmission

Comparisons were made between data from Mocagua and San Martín about the impact of tourism on wildlife in the local communities. Evidence suggests that folk taxonomy and TEK varies between the two communities. Observations during the study indicated that children in San Martín have more frequent access to traditional knowledge through time spent with adults than young people in Mocagua do. Both schools follow a modern curriculum however children in San Martín are taught by local Tikuna teachers, whereas all but one of the teachers in Mocagua are from Leticia. This means the content of school lessons varies markedly between Mocagua and San Martín, and Tikuna is spoken much more frequently in San Martín. Despite these observations, when systematic comparisons were made in the way that different aged participants categorised species during written tasks, age had a significant affect in both communities, suggesting children from Mocagua *and* San Martín had limited access to traditional knowledge (number of species named by children compared to adults in Mocagua χ^2=45.88, n=183, df=5, p<0.05; number of species named by children compared to adults in San Martín χ^2=11.89, n=183, df=5, p<0.05). Unexpectedly, results show that there is a greater difference between the length of species lists written by children and adults in San Martín than the lists written by children and adults in Mocagua. These data may be somewhat biased by the fact that the sample population of children were younger in San Martín than they were in Mocagua. As well as the difficulty in encouraging very young children to sit still for any length of time to complete written tasks, they also tend to know less than older children and adults as young children are unable to retain a large amount of detailed information [Catald and KewalRamani 2009]. **Figures 6.1** and **6.2** illustrate this through the higher number of species named by adults when compared to children in both Mocagua and San Martín.

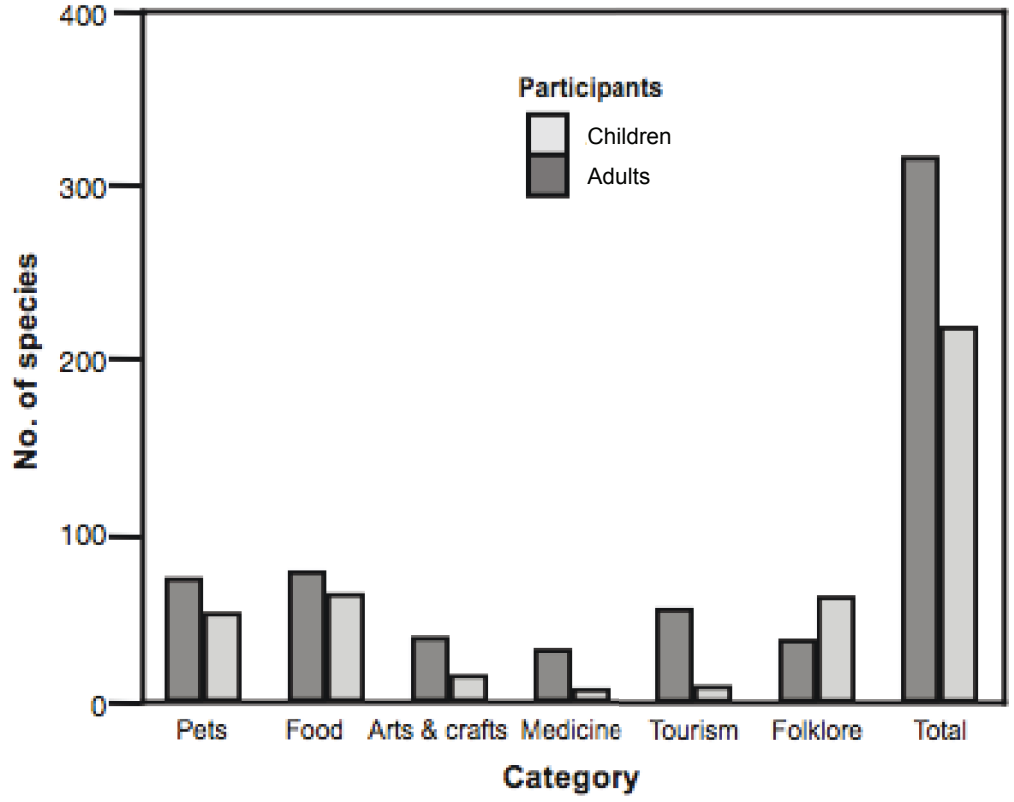

Figure 6.1 Number of animal species named for six reference categories by adults and children in Mocagua in the Colombian Amazon

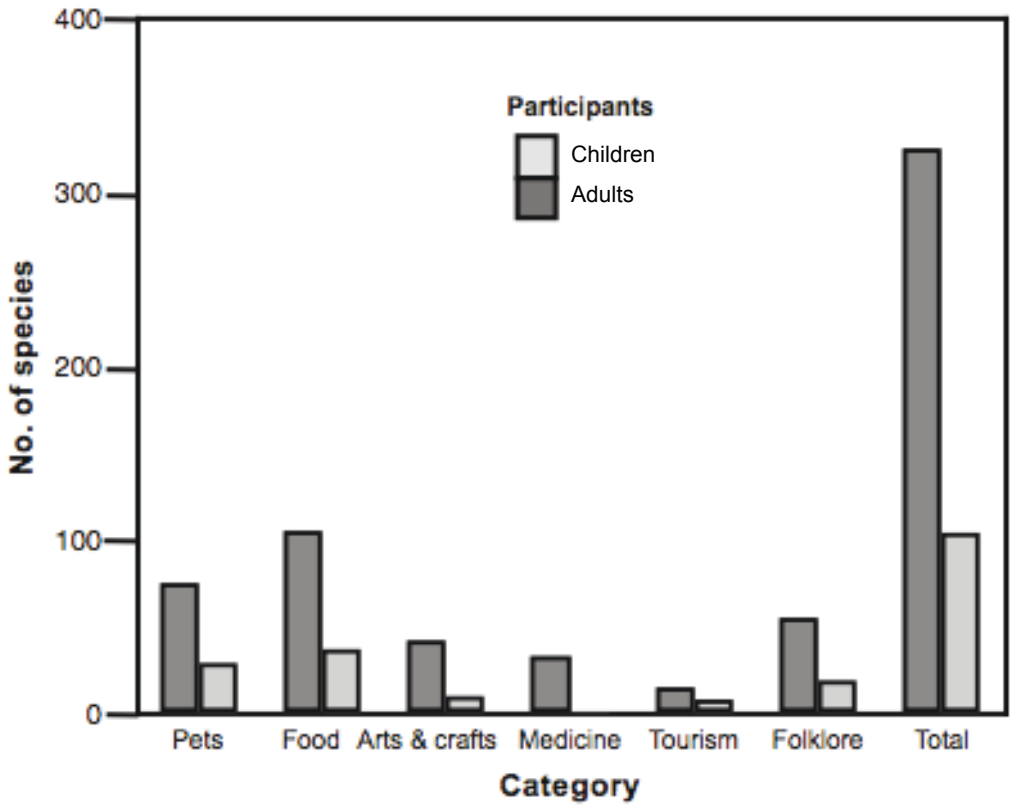

Figure 6.2 Number of animal species named for six reference categories by adults and children in San Martín in the Colombian Amazon

6.4.2 Diet

Community data on diet were examined by looking at prey choice, meal composition and the frequency with which different taxa were eaten in Mocagua and San Martín. These data suggest diets were heterogeneous in many respects with the consumption of different species indicating variations in prey availability, local practices and food choice.

6.4.2.1 Dietary composition

Dietary records show that participants from Mocagua consumed more animal protein overall, than did people from San Martín [underlined in **Appendix XX**]. This is assumed to be partly the result of lower hunting rates in Mocagua which have allowed time for local wildlife populations to recover in Mocagua's territory [Maldonado 2012] and because of a greater access to financial resources in Mocagua which mean people can rear domestic animals and buy meat and fish when they need it. While both communities ate fish in a similar number of meals during the study, mammals and birds were eaten more frequently in Mocagua than they were in San Martín. Indeed a Chi-square test to compare the number of meals consumed in each community containing different types of animal protein revealed a significant difference in the amount of meals containing mammals and birds (mammals: χ^2=20.77, n=274, df=1, p<0.05; and birds: χ^2=27.56, n=274, df=1, p<0.05).

Half the meals recorded in Mocagua contained meat or fish, while birds accounted for more than 80% of the meat consumed [underlined in **Table 6.3**]. Most of the birds were bought from elsewhere or reared in the community. Differences in the number of meals recorded in the two communities can be explained by the frequency that participating families completed their log sheets. These data have been converted into percentage values calculated from the total numbers of meals eaten in each community, to account for differences in the number of meals recorded by the two sample populations from Mocagua and San Martín.

Table 6.3 Percentage of meals consumed in Mocagua and San Martín over a ten month period containing different animal protein, calculated from the total number of meals eaten in each community for each taxa [underlining indicates data referred to in the text]

	n	Fish %	Mammals %	Birds %	No meat %	Insects %	Reptiles %
Mocagua	497	57.2	68.3	83.6	41.7	20	50
San Martín	325	42.8	31.7	16.4	58.3	80	50
Sample population	822	67.3	19.9	7.5	4.4	0.6	0.2

To further understand the types of meat (excluding fish) consumed in Mocagua and San Martín the frequency that primary prey species were eaten compared to 'other meat' such as insects and reptiles was compared. My observations in the communities suggested insects and reptiles were usually killed during opportunistic hunts or consumed for specialist uses and medicinal purposes [**Chapter 4**, **section 4.4.3.2**]. Indeed, in line with previous dietary studies (e.g. Peres and Nascimento [2006] for the Kayapó Indians of southeastern Amazonia) birds and mammals were identified as providing the main bulk of animal protein eaten in Mocagua and San Martín. The results suggest there was a significant difference between the frequency that primary prey species (birds and mammals) and 'other meats' (insects and reptiles) were eaten (χ^2=11.62, n=255, df=2, p<0.05). When these values are converted into percentages, calculated from the total number of meals eaten in each community, data show that mammals and birds were consumed more frequently in Mocagua than in San Martín and people go without these principal prey items more than twice as often in San Martín than they do in Mocagua [underlined in **Table 6.4**].

Table 6.4 Percentage of meals consumed in Mocagua and San Martín over a ten month period containing different categories of prey, calculated from the total number of meals eaten in each community [underlining indicates numbers referred to in the text]

	n	Principal prey %	Other meat %	No meat %	Total %
San Martín	135	70	15	15	100
Mocagua	120	87	6	6	100
Sample population	255	78	11	11	100

A summary of these data are arranged in order from most to least frequently consumed taxa in each community in **Fig. 6.3**. This shows that fish is the most frequently consumed source of animal protein in Mocagua and San Martín, and that people in San Martín go without meat or fish more often than people in Mocagua because of a greater access to birds in Mocagua (as explained above). Peoples comments suggested they do not typically choose to eat vegetarian meals but go without meat or fish where they are unable to obtain it. In fact a meal without animal protein is regarded as insubstantial, inadequate or "*incomplete*" [F. Vasquez, August 2007]. For example, during conversations with women about the meals they prepared they often remarked on not having eaten where there was no meat or fish available [June 2007-June 2009]. These notions can be associated to the psychological stress brought about through a lack of prized foods, as explained in **Chapter 4** [**section 4.5.3.1**] on 'meat hunger'.

Figure 6.3 Frequency that different animal proteins were consumed in Mocagua and San Martín over a ten month period in the Colombian Amazon

6.4.2.2 Prey choice and quality of meat

As well as the frequency with which different taxa were eaten the types of wild animals that people ate varied between the communities. Differences in prey choice were examined by comparing the types of foods eaten at the species level. Where domestic cows and pigs were eaten in Mocagua, smaller, less 'typical' prey (such as night monkeys, sloths, and species exhibiting undesirable traits identified in **Table 5.4**) were eaten in San Martín [underlined in **Appendix XXI**]. Indeed, dietary records indicate that domestic meat was consumed significantly more frequently in Mocagua than it was in San Martín (χ^2=37.44, n=59, df=1, p<0.05) [**Appendix XXII**] mainly because of the high number of chickens that people ate in Mocagua [**Fig 6.4**]. Consistent with this a higher number of families consumed domestic meat in Mocagua (75%, n=8) during the study than they did in San Martín (18%, n=28). Despite meat being more widely spread between people in Mocagua than San Martín, one family consumed over half of the meat recorded in

Mocagua (53%, n=59) indicating unequal access to preferred foods because of status and wealth. Furthermore, Chi-square tests conducted at the 5% level show a significant difference between the amount of wild and domestic meat consumed in the communities but not for tinned meats [underlined in **Table 6.5**]. Participants said that while bushmeat is favoured, domestic meat is preferred over processed meat and fish because it tastes better and shows to others a level of financial status [detailed in **Chapter 4, section 4.5.3.3**]. In **Chapter 4** it was proposed that meat of a higher quality is consumed in Mocagua than in San Martín. Indeed, data show that although a rare occurrence, families in San Martín ate more tinned meat and fish substitutes than did families in Mocagua, while in Mocagua more expensive frozen chicken and beef was bought instead [section **4.4.5.4**].

Table 6.5 Comparisons between the number of meals consumed in Mocagua and San Martín containing wild, domestic and processed meat over a ten-month period, combing data from both communities [significant values are underlined]

	Wild species	Domestic species	Processed meat	Meat consumed
Chi-square value	23.41	37.44	0	37.85
df	1	1	1	1
p-value	p<0.05	p<0.05	p>0.05	p<0.05
Significance*	*sig*	*sig*	*ns*	*sig*

**ns* = Not statistically significant at the 5% level *sig* = significant at the 5% level

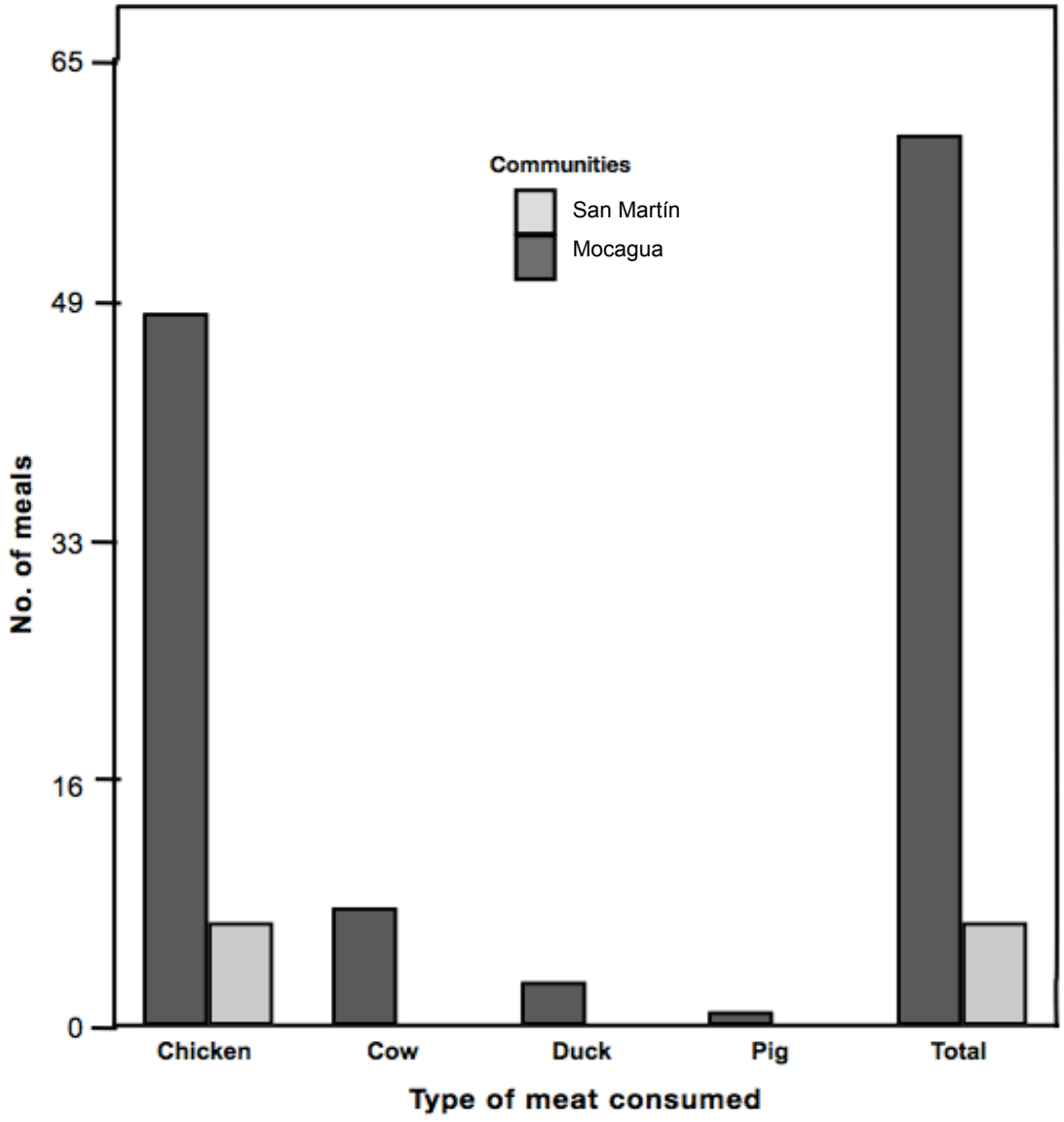

Figure 6.4 Number of meals containing different types of domestic meats eaten in Mocagua and San Martín over a ten-month period in the Colombian Amazon

6.4.3 Local perspectives and film-making

Participatory Film-making (PFM) was carried out as a participant-led research method that provided valuable information about local people's personal interests and priorities related to wildlife and the environment. The videocamera offered a tool for local people to produce films and share information as well as make personal records of their experiences, and events in the community. Both communities produced a similar number of films in total (47 in Mocagua and 30 in San Martín). While these were mainly produced by women's groups, about food preparation and medicine (38% films made overall), participants from San Martín also made a number of films about the local culture, Tikuna folklore and traditional ceremonies [underlined in **Table 6.6**]. By contrast some people from Mocagua chose to record themselves at work in the tourist lodge or discussing other roles of employment in research and conservation.

Table 6.6 Types of film projects produced by local people during Participatory Film-making in Mocagua and San Martín over a ten month period in the Colombian Amazon [underlining and bold identifies data referred to in text]

Topic of film project	Mocagua	San Martín	Total
1. Food preparation and medicine *i.e. communal cooking sessions and preparing food for the family*	15	14	29
2. Work in tourism *i.e. talking about work as a guide, and at 'The Animal House'*	5	0	2
3. Folklore and ceremonies *i.e. recording music and songs about the forest*	1	10	33
4. School projects *i.e. trips by the researcher to the forest, recording plays*	12	4	16
5. Sporting events *i.e. local football matches and tournaments*	3	2	5
6. Other local individually led initiatives *e.g. making guava jam to sell, promotional video for Maloca 'eco-stay'*	12	0	16
Total	47	30	77

6.4.4 Family Profiles: Mocagua and San Martín

The ways in which people interact with animals and their environment are related to the livelihood strategies they adopt. These varied considerably in the communities of Mocagua and San Martín and differences were observed during the study between the two communities. Differences were evident in the ways people's homes had been built or modified (i.e. through the addition of zinc roofs, water tanks and ceramic toilets), the daily practices they carried out (i.e. working in the chagra or at the tourist lodge) and the structure of their family life (i.e. spending time together in the evenings or parents arriving home late from work). For example, it was discerned that while a number of families in Mocagua had modified their houses very few homes in San Martín had been refashioned because of a lack of money to make 'home improvements'. A number of people from Mocagua said they had used money they had earned through their work as guides, in the tourist lodge and at the visitors centre. The following profiles provide examples of the different livelihood strategies adopted by two families, one from Mocagua and one from San Martín, illustrating some key differences between the communities caused by outside intervention and the different opportunities they bring to the area.

6.4.4.1 Case study one

Family 1: San Martín *Don Agusto Moren (50 years old, husband of Maria), Maria Moren (51 years old, wife of Agusto), Lorena Moren (26 years old, daughter of Agusto and Maria), Rudolfo (24 years old, Lorena's partner), Karen (3 years old, daughter of Lorena and Rudolfo), Lorena and Rudolfo's baby (2 months old)*

The Moren's are a family of artisans; "*One of the best in the community*" [R. Pinillo, May 2007]. They live in a traditional-style house made from natural materials and built on the edge of the forest with easy access to a variety of plants, trees and other wild resources. Maria is a community leader and skilled craftswoman. During the day Lorena stays at home, cooking and caring for her children. Rudolfo is a hunter from the Puto Mayo Region in the South west of the country. He settled in San Martín after meeting Maria. The family speak Tikuna as their first language but they also understand Spanish. Don Agusto is an artist and fisherman. He spends evenings telling folkstories to the children. They have two dogs which he takes hunting, and chickens roosting inside the house which provide eggs for the family. Don Agusto and Maria devote time to working in the *chagra* where they grow food for the family. They cultivate plantain, manioc, peppers, mangoes, coconuts, lulos and papayas. Every 3-4 days Don Agusto lays down his fishing nets in the early afternoon and collects them the following morning at sunrise. Rudolfo helps when he has time. "*Normally I catch 20-50 fish. I only need to go fishing once or twice a week and we have plenty*" [A. Moran, June 2008]. Lorena and Maria make jewellery and bags to sell to tourists, and Don Agusto paints designs which depict scenes from Tikuna folkore onto natural parchment [**Fig. 6.5**]. Most of his paintings are based upon traditional symbols representing the forest and the river [**Fig. 6.6**]. They acquire everything they need from the *chagra*, river and forest. Collecting seeds and feathers, extracting dyes from plants, using *yanchama* to make paper and harvesting palm fibre for chord (*chambira*). Don Agusto is teaching Rudolfo how to make artisan crafts. He makes ornamental blow darts out of *topa* (a soft wood); "*We use natural dyes or the tourists won't buy them. They like them to look as traditional as possible*" [Rudolfo, June 2008]. The family sell their crafts in Leticia and at the ANP visitors centre. This small-scale business is important for the family as it enables them to supplement their diet with purchased foods when necessary, and buy basics for the family, including salt, oil, tobacco, and school equipment for Karen.

image removed

Figure 6.5 Don Agusto painting at his home in San Martín, Colombian Amazon

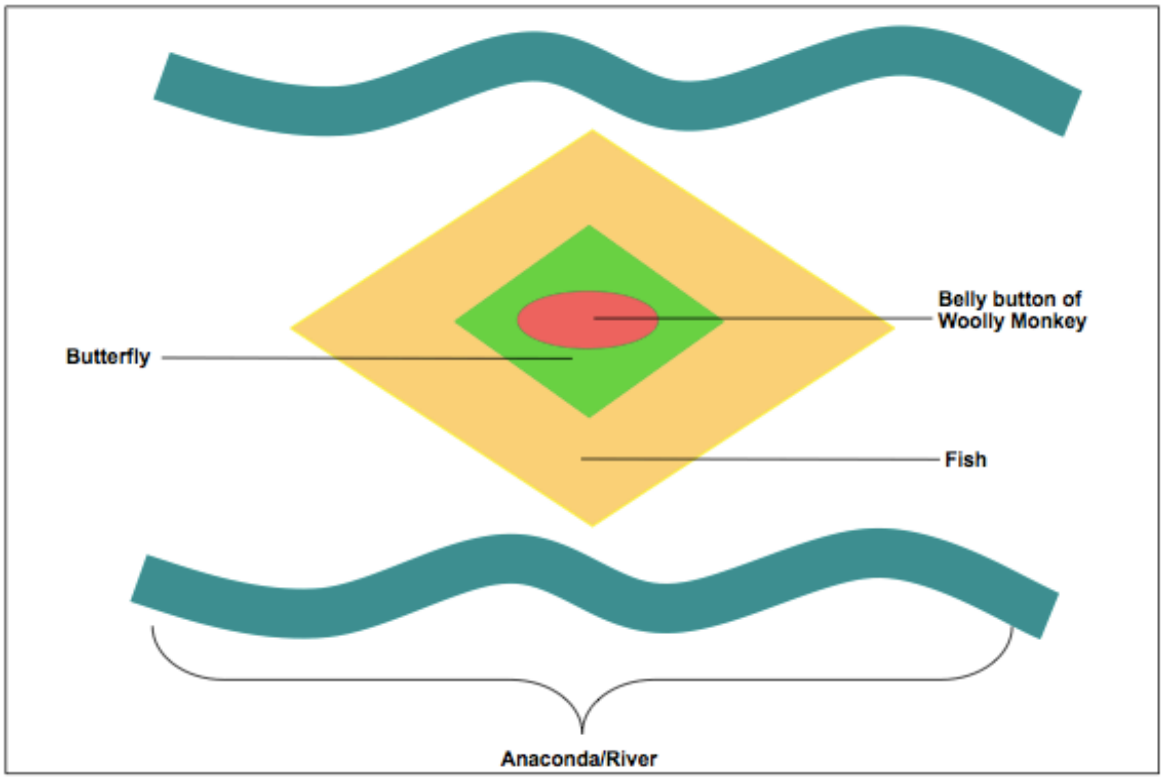

Figure 6.6 Depiction of the symbolic design in a traditional painting by Don Agusto from San Martín, representing the holistic relationship between the forest and the river

6.4.4.2 Case study two

Family 2: Mocagua *Léo Vasquez (38 years old, husband of Luci), Luci Moran de Aguila (35 years old, wife of Léo), Priscilla (10 years old, daughter of Léo and Luci), Luisa (5 years old, daughter of Léo and Luci)*

Léo and Luci Vasquez live in Mocagua with their two daughters Priscilla and Luisa. They have a relatively large house which has been modified over recent years. Léo was appointed as *Curaca* by his community in 2005 but stood down after one year to spend more time with his family. He still carries out important roles in Mocagua and remains involved in community decision-making. "*Many people won't stand as Curaca as there is no money involved. Even though you don't get paid it's good experience and important work. You travel a lot but don't have much time at home*" [L. Vasquez, June 2007]. Luci is the daughter of a knowledgeable hunter in the community and has learnt much about the forest through conversations and time spent with him as a young girl [L. Moran de Aguila, pril 2007]. Neither Léo nor the children speak Tikuna fluently but Luci does. She spends time teaching it to the children at home. Léo encourages his children to speak Spanish and English, read widely and listen to the world news on the radio. Priscilla [**Fig. 6.7**] helps her younger sister with her homework most evenings. There are photographs of Léo and Luci's older children collecting their graduation certificates, hanging on the wall in their home. Their three sons (Jesse, Léo and Wilmer) and their eldest daughter (Nini) all studied in Leticia and now live away from home. The family own two dogs, chickens, a cockerel, turkeys and ducks which live in purpose built shelters outside the house. The family cultivate caymos, pineapples, guamas, lulos, yuca, plantain, avocados and oranges in their garden. Neither spend much time in the *chagra* as they both work at the ANP visitors centre and tourist lodge. Luci is a cook in the restaurant and Léo is a tour guide. The money they earn has been invested in the home and their children's education. The house has a water tank, meshed windows, a tin roof, light bulbs a stereo and a television. They have a ceramic toilet with cement floor and drainage system. When there is gasoline to run the community generator they play music and watch DVD's. Some evenings Luci and Léo work late at the Park so the children buy convenience food from the local store which they prepare themselves at home.

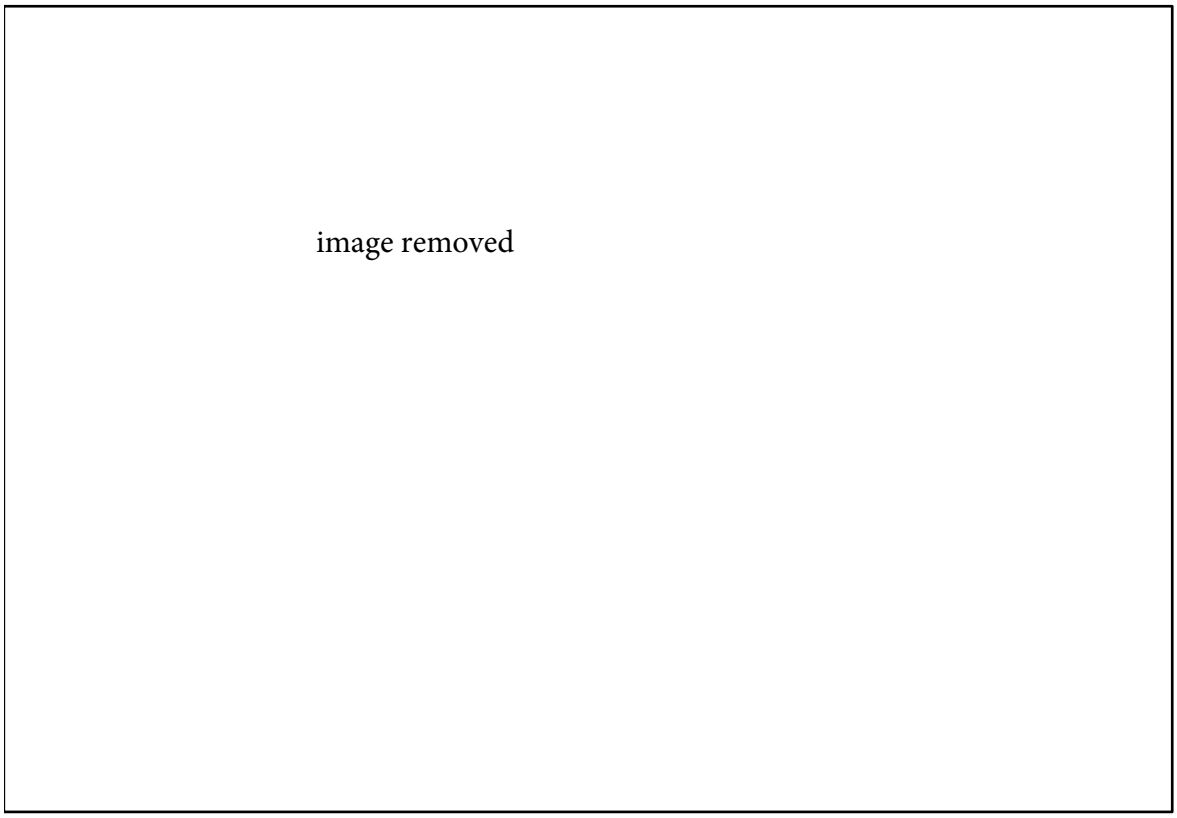

Figure 6.7 Prisci (in turquoise) with her friend at school, standing in front of a mural painted by children from Mocagua and volunteers from The Woolly Monkey Conservation Project in 2006

6.5 Discussion

6.5.1 Prey choice and availability

People in Mocagua and San Martín adapt their lives in response to different environmental, social and economic changes and this influences people's perceptions of the environment and the ways they interact with wildlife in different ways. Prey availability and species diversity differs between the communities which consequently influences the local diets of families in Mocagua and San Martín. Dietary data indicate that meal composition varied, with more protein of a higher quality being consumed in Mocagua than in San Martín. This included bushmeat and domestic species, which implies access to more wild prey in Mocagua as well as conditions that favour the rearing of livestock for meat. Furthermore, during the study people went without meat more frequently in San Martín than they did in Mocagua and consumed a greater frequency of small-bodied prey and other less common prey species in San Martín.

People's comments suggest that large mammals and birds are preferred over smaller prey, and so small-bodied animals are only harvested in times of shortage. One woman explained; "*Small animals like 'piel roja'* (the pygmy marmoset or *Cebuella pygmaea*) *are not prey. They have little meat...but sometimes if you find one it is OK for a snack*" [Female participant, 56 years of age, Mocagua]. Indeed, some informants said that when less preferred prey were available people chose to hunt opportunistically and harvest which ever species they chanced upon. One hunter explained; "*Sometimes you can be looking for meat for days with no luck. It's better to bring something small back than nothing at all"* [Male participant, 53 years of age, San Martín, November 2009]. Further to this, tradition stipulates that when prey appears to hunters it is seen as an 'offering' sent by the species' *dueño*, and must not therefore be refused for fear of offending the *curupira*[43] [Hunters, June 2008].

These findings imply a lower number of principal prey items are available in San Martín than they are in Mocagua. They also suggest that people from San Martín more frequently chance across 'unusual' prey and switch to opportunistic hunting. Additionally, a number of less likely prey are recognised as 'special foods' because

[43] The *curupira* is believed to be the mother of the forest.

they require some time and effort to acquire, such as the *mojojoy* described in **Chapter 4** [**section 4.5.2.1**]. This suggests that people in San Martín spend more time in the forest than do people from Mocagua, a notion also supported by the qualitative data. Participants from Mocagua frequently commented on having little time to hunt, fish and cultivate the *chagra* because of time spent at work. At the time of the study several of the women in Mocagua were cooks and cleaners at the tourist lodge and explained their schedules were too busy for the intricate preparation of traditional dishes and 'special' foods whereas *mojojoy* was prepared on a number of occasions in San Martín as an all day communal event.

Prey choice is also influenced by cultural beliefs and personal preferences for certain foods [**Chapter 4, section 4.4.5.3**]. While insects provide a minimal amount of protein some are considered important foods by local people, such as the *mojojoy* grub. Indeed, among some cultures in parts of North, Central and South America, Africa, Asia, the Middle East, Australia and New Zealand entomophagy is common practice due to the abundant stores of lysine in insects [Gullan and Cranston 1994; Saggers and Gray 1991; McElroy *et al.* 1989]; an especially valuable amino acid often deficient in the diets of people who suffer other food shortages [Gordon 1998]. In their in-depth ethnography of eating habits Mintz and Du Bois [2002] suggest these variables can be explained only by understanding the cultural aspects of food choice. Similar to Mintz's earlier work [1996], they claim that the meaning of certain foods chang according to their availability and as foods become more difficult to acquire they are considered increasingly precious. Archetti's [1997] research into guinea-pig consumption in Ecuador has similarly illustrated the significance of prey as a cultural symbol as well as a source of protein.

6.5.1.1 Local hunting pressure

Maldonado [2010: 10] determined that hunting rates (measured between February 2005-2009) were three times higher in San Martín than they were in Mocagua which she found caused notable differences in prey availability between the two communities. She calculated that wild population densities of four local mammal species (*Tayassu pecari*, *Myoprocta pratti*, *Aotus seniculus* and *Lagothrix lagothrica*) were significantly lower in San Martín's territory than in Mocagua's [Maldonado 2010]. Indeed research in other areas suggests that a number of

forest peoples acquire the majority of their meat from a relatively small selection of large-bodied mammals which may as a consequence then become vulnerable to extinction [Robinson and Bennett 2004; Robinson and Redford 1991]. For example Mena *et al.* [cited in Robinson and Bennett 2000] reported that the Ecuadorian Huaorani attained 44% of harvested biomass from large-bodied woolly monkeys (*L. lagotricha)* and collared peccaries (*T. tajacu*), both of which provided a substantial amount of meat per kill. Alvard *et al.* [1997] found that the Machiguenga bow-hunters and Piro shotgun hunters of Peru caused the local depletion of certain species of wildlife, while more recently, Peres and Nascimento [2006] provide evidence that 89% of censused species are significantly depressed by local hunters.

While these findings provide one explanation why more large mammals were eaten in Mocagua than they were in San Martín, not all large-bodied mammals are equally vulnerable to extinction through hunting. For example, collared peccaries sustain their numbers during high hunting levels because a depression in their population density increases the rate at which they can reproduce [Bodmer *et al.* 1997]. Furthermore, Bodmer [1994] and Silvius *et al.* [2004] have reported that prey-size data are misrepresentative of prey availability where hunters switch from game to fish or where they underreport kills of small species through embarrassment or other constrictions which may mean these data are somewhat misleading.

6.5.1.2 Exploitative industries and protein alternatives

Several publications suggest the crux of the debate over access to resources in the Amazon is linked to the availability of meat and fish for local people [Rist *et al.* 2008; Milner-Gulland and Bennett 2003; Fa *et al.* 2002]. Besides changes in harvesting techniques commercial logging, hunting and fishing have been identified as problems that contribute to the decline of local species densities in ANP. Furthermore, these exploitative industries encourage the switch to modern harvesting methods in attempts to overcome resource shortages [Maldonado 2012]. Indeed, Ohl-Schacherer *et al.* [2007] propose that where game stocks are depleted significantly, consumption rates are temporarily maintained through the introduction of improved hunting and fishing technologies. In support of this suggestion an elderly woman from Mocagua remarked, "*There used to be many*

more fish when I was young. I remember seeing huge fish jumping out of the river. It was filled with so many different species; 'dorada', 'pira rucu'...but now you can't find these species". She added, *"People used to fish with an arrow but now they use 'barbasco'*[44] *and come with big nets. The dolphins have moved closer to the beaches and you never find manatees anymore"* [J. Cayetano, December 2009]. As well as quick-acting *barbasco* poison, dynamite fishing is carried out by commercial harvesting industries. Fish were widely available at the time of the study but informants mentioned that in 2006 water levels fell drastically and a three-week drought caused the death of large quantities of fish and brought illness to the villages [Male and female participants, April 2009].

When wild fish and meat were in limited supply some families in Mocagua and San Martín ate domestic meat or protein substitutes such as tinned tuna, sardines and corned beef. However, access to these foods depends largely upon people's financial resources. Data suggest that people in San Martín eat less domestic meat than do people in Mocagua because of a number of variables including the following: i) only those families earning a sufficient salary can rear domestic animals successfully; ii) the safe storage of meat bought from outside the community requires financial resources and; iii) as well as economic limitations a number of people from Mocagua and San Martín choose not to rear domestic animals for meat as they fear other members of their community will kill or steal the animals from their homes. While some families in Mocagua have more recently have been able to invest in the purchase of turkeys and goats one person told me; "*They are expensive to buy and keeping goats entails high overheads. It is only possible to properly care for the animals when someone in the family is earning a regular salary"* [E. Chota, November 2008].

6.5.2 Disparities between communities

Comments from local people also suggested that the provisioning of jobs as wildlife guides and research assistants, along with environmental education in schools and regular contact with 'The Animal House' have had both positive and negative effects on people's lives in ANP. This has created mixed views among local people. One hunter remarked; "*The woolly monkey meat is the tastiest. It is really delicious but we cannot hunt it anymore. People think it is more important*

[44] '*Barbasco'* is acquired from the root of *D. composita*

that they are kept alive for the tourists" [Male participant, May 2008]. While another hunter commented; "*I used to hunt them [woolly monkeys] a lot but now they are difficult to find. Tourists always want to see woolly monkeys. If there are more monkeys we will get more work because people will be happy and come back again"* [Male participant, February 2008].

My results suggest that the benefits of outside intervention are not equally distributed between local residents. As suggested in hypothesis two more people in Mocagua have better access to jobs due to their proximity to the tourist lodge and research centre than people in San Martín. However, it also appears that certain families in Mocagua receive substantially higher financial benefits from local enterprises and economic opportunities than other families in their community. For example, data showed that one family in Mocagua ate significantly more domestic meat during the study than any other family. As well as having the resources to rear domestic livestock for meat, this household bought groceries from the store (such as hot chocolate, coffee, powdered milk, soft drinks and beer, pasta, oil, salt, sugar, flour, lentils and beans) and had made considerable modifications to their home (such as replacing thatch with zinc roofing). Consequently, whilst a number of people consider money a necessity in times of limited resource availability other people do not.

The divide created by a difference of opinion about outside intervention along with the inequitable distribution of economic resources creates tension between local people, and is the underlying reason that many people oppose such activities in ANP. One hunter explained; "*Other people in the community don't respect the decision the rest of us made not to kill monkeys. It is important we protect them for our jobs. One person killed two woolly monkeys and then killed it's infant as well. A lot of us got very angry. They kill more than they can eat, to sell the meat outside the community. They don't like the fact that we have jobs and they don't*" [Male participant, 53 years of age, Mocagua].

6.5.2.2 Wildlife for tourism and research

As well as the economic benefits provided by tourism, research and conservation these initiatives introduce new ideas which influence people's perceptions of wildlife and how they interact with animals. A number of local people expressed a

real concern for endangered species as a result of information they received through long-term conservation projects. Although a similar amount of conservation has been carried out in both communities the effects appear to be more noticeable in Mocagua than in San Martín because of increased opportunities to be directly involved in tourism, conservation and research projects. For example, while a number of people in Mocagua consider primates as being critical to tourism and the longevity of their job security, others in San Martín suggest the consumption of primate meat is a critical part of certain rituals and ceremonies.

Exposure to tourists, researchers and conservationists seem to act as powerful triggers in shaping environmental perceptions amongst the young in Mocagua. Children and young people regularly receive environmental education because of their proximity to the ANP research centre. Indeed, group activities and casual chat with children showed their participation in conservation and research projects significantly influences their perceptions of wildlife and the environment. Where children spend more time with their families, helping with chores and listening to folkstories, opportunities arise for them to learn about Tikuna folklore and TEK. Modern schooling and the recent introduction of electricity to the communities means the efforts of teachers and parents who teach traditional practices and moral principles to children in the communities are only partly effective. Young people often spend evenings doing homework and when there is electricity most families come together to watch films and soap operas until late into the night. Furthermore, elders from both communities expressed concerns over the impact of outside intervention in their communities stemming from contrasting environmental perceptions between stakeholders and local people [**Chapters 3 and 5]**, unease over a loss of Tikuna identity and tradition [**Chapter 5]** and the influence that these practices have on local people's access to wild resources **[Chapter 4]**.

6.5.2.3 Local conservation priorities

In line with ANP's policy to facilitate grassroots projects and collaborative resource management, local residents are encouraged to propose community projects to the UAESPNN for financial assistance. The types of initiatives put forward by people from Mocagua and San Martín further indicate a difference of opinion about what should be the focus of conservation and development in their communities.

These were reflected in the films they made. Mocagua's inhabitants have focused their efforts on designing projects that will help them gain skills to work in tourism and research while a number of young people and adults have already been trained as primate carers at 'The Animal House' as well as being involved in 'The Piuri Project' [**Chapter 4, section 4.5.5**]. A number of hunters have also switched to being research assistants and tour guides. One local resident wrote a bid to build an ecotourism lodge in the forest for tourists to visit. In San Martín, by comparison, community proposals have centred around the recuperation of Tikuna culture and indigenous identity. A *maloca* was constructed in which to carry out traditional ceremonies [**section 6.1.1.1**] with financial support from the UAESPNN, and a group of women were shown how to write a business plan for a Tikuna restaurant serving traditional foods to paying visitors. In addition, as previously mentioned a temporary ban is in place in San Martín preventing any further research being carried out. The decision was made after negative ramifications were experienced by the community following culturally insensitive projects which generated minimal benefits to local people [Male participant, 32 years of age, San Martín]. The focus of the projects proposed by San Martín strongly reflect their feelings of anxiety over the imposition of outside intervention and its disregard for local culture and tradition.

6.6 Conclusions

- People from Mocagua and San Martín named a similar variety of animals in written tasks. Species categorisation showed that both communities consider the main uses of wild animals as being for food and as pets, however people in Mocagua also regard wildlife as being important for tourism.
- In San Martín people go without meat more frequently than do people in Mocagua. Smaller, ‘unusual‘ prey which are acquired opportunistically are also eaten in San Martín whereas Mocagua’s inhabitants have access to a wider variety of domestic and frozen meats.
- Observations in the communities suggest children in San Martín have more opportunities to learn traditional knowledge than children from Mocagua do. They are taught by indigenous teachers and are less exposed to environmental education and tourism. However written tasks showed a greater difference in the way adults and children categorised animals in San Martín than in Mocagua.
- The two locations of Mocagua and San Martín provide different environmental, social and economic conditions which influence people’s access to meat as well as their attitudes towards regulations over the use of natural resources.
- The importance of wildlife for conservation, research and tourism in Mocagua and San Martín is considerably greater among those people who are directly involved in these practices, and receive regular financial benefits from them.
- San Martín’s residents have focused their efforts on preserving traditional practices, beliefs and customs whilst in Mocagua involvement in conservation, research and tourism has taken precedence.
- Mocagua’s proximity to the ANP tourist lodge and research centre creates increased access to jobs in tourism, conservation and research which means that most people in Mocagua favour these innovations and receive economic benefits from them.
- A reduction in local wildlife densities in ANP has left people in Mocagua and San Martín with no option but to interact in new ways with wildlife and adopt alternative livelihood strategies.
- The unequal distribution of economic resources and job opportunities in Mocagua and San Martín creates mixed views about outside intervention which creates tensions among local people and between stakeholders.

Chapter 7

Discussion

"Wildlife as a conceptual reality"

Chapter 7: Discussion “Wildlife as a conceptual reality”

7.1 Experience in the ‘real’ world

7.1.1 Coexistence in a changing reality

Throughout history the Tikuna have coexisted with animals in various ways. Human-wildlife associations develop through ideas shared in Tikuna folklore, traditional rituals and practices. However these customs are becoming increasingly rare as local people now also regard conservation, research and tourism as integral parts of their lives. Gender specific roles and people’s age generate specialised uses of wildlife among different sectors of the community which also affects their relationships with animals. For example, while children learn some ecological knowledge from adults in Mocagua their environmental perceptions are more notably influenced through conservation practices, research and tourism. I have provided evidence to show just how varied and changeable these factors can be and attempted to portray a truthful and accurate account of what life is really like for the Tikuna in ANP. In the previous chapters I have discussed how the Tikuna interactions with wildlife are influenced by environmental conditions, people’s cultural, nutritional, social, political and economic needs. I propose that the ways in which local people view the world and interact with animals is being redefined as indigenous communities move away from a subsistence lifestyle.

Evidence shows that the commodification of wildlife, whether through the sale of meat or the conservation of flagship species for tourism, is becoming increasingly important to people in Mocagua and San Martín as resources diminish and people are more accustomed to a consumer lifestyle. This is especially true among families in Mocagua who rely more on earnings to secure household needs than do families in San Martín. Besides paying for school fees, uniforms, transport and medication, every day commodities such as vegetable oil, salt, candles and soap have become necessities, not to mention gasoline to run the generator and luxury items such as televisions, radios, DVD’s and mobile phones. Furthermore, hunters in both communities use rifles and cartridges and most families own machetes and agricultural tools. Despite these observations, during discussions a number of elderly hunters said that money is having negative repercussions on the

community and the ways in which people interact with wildlife and each other; "*Some families don't have time to grow food and are left no choice but to buy food from the town, local shop or from other people. This is damaging our community*" [Hunter, 40 years of age, Mocagua].

As well as the cultural, environmental, cognitive and socio-economic factors a number of regulations introduced to limit local resource use place further pressure on local people. The implementation of hunting bans, harvesting quotas and the introduction of domestic livestock all have implications and add to the intricacies of human-wildlife interactions. This further affects what people eat, which species they use in traditional medicines and crafts, which animals they associate with folklore and their opinions about outside intervention and conservation. According to Latour [2005], "*There is no basic structure of reality or indeed a single, self-consistent world, but an inconceivable multiplicity of realities*". The task of the researcher, he claims, is not to give reasons or find explanations to human-nature relationships but to recognise that a variety of philosophical and perceived states exist. Latour [2005] argues that the researcher "*learns the actors' language, records what they say about what they do, and does not appeal to a higher structure to explain the actors' motivations".* It is because of these inherent complexities that examining inter-species engagements in areas of conservation interest such as ANP is of paramount importance.

7.1.2 Cognition and engagement

This study has shown that human-wildlife associations and people's environmental perceptions are shaped by different knowledge and local belief systems. Indeed Heckler [2012] suggests that our environmental perceptions are devolved in material practices and in the landscape, retrievable only through an understanding of intellectual and collective interactions. These are what form people's moral principles and attitudes towards animals and guide the way they categorise and classify species. This is explained by Latour [2000] in the following way; "W*hile ontology entails assumptions about the characteristics of what exists, epistemology involves suppositions about how humans know, how they learn and how they preserve and expand on what is already known*". As established in **Chapter 5** [**section 5.1.2.3**] while modern education provides opportunities for the young in indigenous societies, several studies suggest it may also limit their appreciation

and understanding of traditional knowledge systems [Aikenhead 2011; Margulis cited in Harding 2006; Rival 1998]. Furthermore, young people miss out on specific social and cultural elements, such as hunter-prey relationships which guide intimate relationships with other species [**Chapter 5**]. Indeed, Daniggelis [1997] has suggested that Indigenous Knowledge Systems (IKS)[45] are indispensable to societies' abilities to adapt to difficult or unpredictable environments. The Australian project 'Rekindling Traditions' more recently approached the issue of colonial education in its native communities and how it so often fails to provide real opportunities for indigenous children [Aikenhead 2011], while a number of other publications have provided convincing arguments that indigenous knowledge and pedagogical processes should be incorporated into the education systems of traditional peoples [Rival 1998; Abram 1997; Daniggelis 1997].

Traditional Tikuna folk taxonomy differs from Western scientific classification in that it refers only minimally to the physical characteristics of animals and draws a number of parallels with human societies. Central to people's perceptions of wildlife in Mocagua and San Martín are the networks that people form with other sentient beings and the biosphere. Among the elderly these are based upon shamanism and inter-species communication where animals are conceived as social beings with personalities, opinions and specific behavioural characteristics. Consistent with these notions older people categorise animals according to the hierarchical and social structures of society. They see animals as leaders, advisors, messengers and decision makers, and recognise distinctions between hunters and animal-persons. Prey are distinguishable from animal-persons which are human-like and shape-shift between realms by interchanging bodies whilst affixing their souls, enlacing humans and animals into a single existence. Indeed, early ethnographies of the Tikuna suggest that their cognition and engagement with the natural world is reflected in the traditional kinship system, and that this is organised into clans and moieties which are identified by the names of those birds, insects, mammals, and plants with which they are most closely related [Cardoso de Oliveira 1970].

[45] Also referred to as Traditional Ecological Knowledge or TEK.

7.1.3 Learning through experience

It appears that human socialisation with animals is inseparable from knowledge and perceptions, and that these things are established through naming, classification and categorisation. In 1976 Dwyer proposed that, "*The relationship (between human and other) is metaphoric but made real by being given a label or a name*. *In this way relationships are established in the mind as something that contrasts with all other things in the world"* [Dwyer 1976 in Dwyer 2005: 18]. Taxonomies were seen as "*the unintended product of a process of metaphorization*" i.e. cognitive processes made real through engagements or actions. Thus the provisioning of names to objects emerges from environmental perceptions which are constituted through human-wildlife interactions. In support of these notions Ingold [2000] argued that, *"[I]t is only through engagement with an experienced world that the world itself comes into being around the organism (or person)*". He challenged the view that people construct the world and attach meaning to it, prior to acting in it and described the human-being as *"a single locus of creative growth within a continually unfolding field of relationships*" [Ingold 2000: 5-6]. In this sense the relevance of the perceived and real notions people associate to wildlife are homogenous, and the labels used to identify organisms not only substantiate the way animals are conceptualised but also represent human cultural selfhood. Ingold's [2000] work underlies the basis of ethnoecology and ethnoclassification as it demonstrates how our actions and words are indivisible from how we perceive and engage with the human and non-human components of our environments.

7.2 Perception and reasoning

7.2.1 Holistic reasoning and sustainability

All humans share the same tools of consciousness for memory and reasoning and yet diverging ecologies, cultures, social structures, philosophies and educational systems are the cause of great differences in the ways we perceive and interact in the world [Dwyer 2000]. Indeed, Dwyer [2000] argues that, "*The classification of classifications common to the West is divorced from the way local people think about nature and does little to express their lived experience*". This is dependent upon a number of environmental, social and cognitive triggers many of which have been explored by anthropologists, linguists and psychologists. A number of publications suggest language is key to shaping human perception, e.g. Gumperz and Levinson's research into global dialects [1996], Freeman's study of verbs and nouns in 1992 and the 'Sapir-Whorf Hypothesis' [Kay and Kempton 1984]. Freeman [1992] showed that the use of verbs and nouns are tailored to suit cultural understandings through sentence structure, while the 'Sapir-Whorf Hypothesis' claimed that speakers of different languages think and behave differently depending on the language they use [Kay and Kempton 1984]. These theories both suggest that language structure reflects our habitual thinking processes which in turn influences our mental representations of the world [Gumperz and Levinson 1996].

The notion that people from different cultures conceptualise the world in different ways, and indeed express these conceptualisations in very different ways, provides an indication as to why indigenous belief systems based upon animism are not understood through Western styles of reasoning [Medin and Atran 2004]. Freeman's [1992] work provides comparative examples between ancient Chinese philosophy (which focuses on relationships and thematic resemblances) and Greek philosophy (which refers to categories and fixed structures). Indeed as detailed in **Chapter 3** [**section 3.1.2.3**] Western science derived from Greek philosophy understands physical and social worlds in terms of fixed attributes arranged in categorical structures. It is based upon linear analytical thinking and dualist rationale, such as mind-body, nature-nurture, human-animal, tradition-modern [Nisbett 2004]. By comparison, animism more common to Amazonian peoples (e.g. the Achuar of Ecuador and Peru, Kohn 2009 and the Houarani of

Ecuador, Lu 2001) is based upon holistic reasoning which focuses on interconnections between things, as described by hunters in Mocagua and San Martín.

The differences between animism and Western Science are further evidenced by Lertzman [2010] as he presents the notion that animism discerns a commonality between species whereas Western science makes distinctions between humans and other animals. Indeed the significance of 'covert' categories among the Tikuna shows that indigenous folk taxonomy does not fit into fixed structures commonly used in the West. The definition of 'animal' as given in The Oxford English Dictionary reads:

"*Any such living organism [which feeds on organic matter typically having specialised sense organs and a nervous system and able to respond rapidly to stimuli] other than a human being*" [Soanes and Stevenson 2009].

This description establishes boundaries between humans and animals, and renounces any possibility of shape-shifting or animal-persons, both of which are central to Tikuna animist concepts [**Chapter 5**].

Lenaerts [2006] provides compelling support for the ideas expressed through the traditional Tikuna belief system. Following his research with the Ashéninka in Western Amazonia he writes; "*The overall result is a holistic worldview free from distinctions between natural and supernatural. "Nature" is divided in a countless (though not infinite) number of disconnected specific points of view*" [Lenaerts 2006: 11]. Lenaerts [2006] goes on to suggest that such misapprehensions are a common difficulty when dealing with indigenous empirical categories of thought. He claims that animal-persons and creatures from folklore are all too often referred to as "mythical" or "imagined" when they are conceived as real sentient beings in the cultures within which they exist. He says, *"There are indigenous conceptions about bodies and "souls"[46], material substances and interpersonal relationships, but these categories do not have exactly the Western sense, and most of all they are interconnected in a distinct, non-Western way"* [Lenaerts 2006: 2].

[46] Here the term "soul" is used as a translation, into the most similar Western concept, of the term used by indigenous peoples to describe the immortal essence of living beings [Lenaerts 2006].

7.2.2 An ‘illusion’ of death

Concepts of souls and spirits are fundamental to indigenous perspectives on religion in South America but these vary in their definitions. Humans have souls, and so too do spirits, animals, plants and inanimate substances. Sacred sites such as trees, mountains, caves, waterfalls, salt licks and underground rivers are also significant and animate. The soul, as defined through Christianity or Catholicism, is the immaterial aspect or essence of a human being. According to Christianity the soul is that which confers individuality and humanity and is considered to be synonymous with the mind or the self. Only humans have immortal souls however, which are able to survive the death of the body and partake in divinity. With the introduction of Catholicism in ANP since the first visits by missionaries in the 1600s the Tikuna have become accustomed to both indigenous and Western interpretations of the word ‘soul’. Indeed, during the study people seemed to use the term ambiguously often switching between the two: i) the soul of an animal which enables communication with the spirit essence and *dueño*, as proscribed through Tikuna folklore; and ii) the soul which is salvaged in heaven after death and protected by God, as endorsed by Catholic priests. Moreover, the traditional Tikuna belief system provides evidence to suggest that humans, animals and plants are constantly shifting in shape and appearance which requires their souls to transcend between human and animal realms [**Chapter 5**].

Descola [2005] maintains that it is only by recognising the transcendental properties of animals that indigenous peoples are able to experience meaningful interactions with other species and engage in intimate human-animal sociality. To kill an animal is contradictory to this and so hunters create notions about the ‘illusion’ of death which make these practices tolerable. The contradictory practice of killing an animal with which close bonds are formed through pet-keeping and socialisation can be more easily understood when hunter-prey relationships, food preparation and the ingestion of animal parts are examined. For example, by making agreements with the *dueños* of the prey they wish to hunt and conceptualising physical transformations that occur when an animal is hunted, converting it from an animal into food. This assumes the role of animals as food to be particularly relevant as it reveals insight into inter-species agreements and special ritualisations, and forms a significant aspect of the Tikuna-animal interface [Serpell 1996].

According to the indigenous Tikuna belief system the sustainability of wildlife depends upon the quality of exchange between the hunter and his prey and the fulfilment of agreed obligations with the *dueño* and forest spirits. This study suggests the Tikuna frequently read signs which they receive from forest spirits and must act accordingly. For example, the Tikuna believe that *dueños* offer animals to hunters as an act of generosity and reciprocity, therefore not to hunt the animal is considered disrespectful and can upset the carefully managed balance between the Tikuna and the forest [**Chapter 6**]. Hunters from Mocagua and San Martín maintain that prey shortages occur because of a disregard for traditional hunting practices which causes animosity between the Tikuna and forest *dueños*; "*Now there is no control. People take whatever they want*. *The dueños are angry and have stopped any more animals from coming*" [L. Panduro, 62 years of age, Mocagua]. Such convictions are effective strategies in managing the use of natural resources, and there is evidence in some regions to suggest that the preservation of indigenous belief systems and practices enable local wildlife populations to recover following periods of sparseness [Bodmer 1994]. When these notions are forgotten or overlooked however they cease to be effective and other solutions must be sought.

7.3 Eating our identity

7.3.1 Hunting and eating as a social practice

A number of conservation issues in the Amazon are caused by food shortages resulting from changes in local conditions. Consequently, understanding resource use in protected areas such as ANP is of paramount importance for the long-term coexistence of people and wildlife. According to conversations with elderly members of the community in Mocagua and San Martín and evidence published by other researchers, wild mammal populations are diminishing in ANP [Maldonado 2012; Gruezmacher 2008]. The combined effect of human population growth, the use of guns, and increased market access has intensified the impact of hunting by indigenous people on wildlife populations. Hunting is now considered a major threat to biodiversity in parts of Amazonia [Maldonado 2012; Terborgh and Nunez-Iturri 2006; Peres and Lake 2003; Fa and Peres 2002; Alvard *et al.* 1997; Hill *et al.* 1997], so much so that studies suggest the rapid decline of wild animal populations in the Amazon is comparable to the "bushmeat crisis" in Africa [Maldonado 2012; Peres and Palacios 2007; Ayres *et al.* 1991; Silva and Strahl 1991].

People choose what they eat and how they acquire food because of a number of interchangeable variables which are highly complex and constantly changing [Safran-Foer 2010]. Hunting and fishing are pivotal components of everyday life in Mocagua and San Martín and this is reflected in people's decisions over pet choice (i.e. keeping dogs for hunting or adopting the young of prey species) and is a central theme to Tikuna folkstories. The practice of hunting and the prevalence of meat in the local diet provide opportunities for human-animal interactions among the Tikuna, which in part satisfies people's nutritional, social, economic and cultural needs. The sustainability of wild animal populations is highly dependent upon environmental conditions however, as well as hunting practices, the use of animals in medicines and crafts and their associated anthropogenic and naturogenic factors. Cultural norms, nutritional and financial gains as well as what people believe they will procure from eating certain foods are also tied up in these beliefs. Such notions are often associated with special or sacred foods which transfer distinctive properties to those who consume them. Finally, species availability influences food choice.

7.3.2 Preference, avoidance and competition

The consumption of food is always imbued with meaning, which is understood and communicated in various symbolic ways: indeed the stature of meat as a highly-prized food was observed in Mocagua and San Martín. For example, despite an abundance of fish in the Amazon River meat is still a more highly regarded food because of the distinctive properties it provides to the consumer, many of which are unobtainable through fish, regardless of the quantity eaten [**Chapter 4**]. Furthermore, a priority concern among men who worked as guides was what food they would be given by their employers and whether they were permitted to hunt during expeditions. One group of hunters who worked as research assistants for a conservation project expressed concern that they would tire quickly, become disoriented and be "unable to walk well" if they had no meat provisions. Where wildlife densities have been significantly reduced however, people's decisions over food choice is largely dependent on availability [Terborgh and Nunez-Iturri 2006]. As shown through the findings presented in **Chapter 4** coping strategies which alter dietary practices come into play during times of food shortages. The absence of preferred prey items in ANP encourages people in Mocagua and San Martín to try other foods previously perceived as being 'inedible', 'too small' or even dangerous to human health [**Chapter 5**]. People are willing to overlook certain beliefs in order to secure a supply of meat. These choices involve a process of decision-making that considers potential conflicts of interest, and obeys cultural and social norms established through commensality. Individual preference, for what something tastes like, its texture or its appearance, also affects these decisions.

Food choice establishes identity and plays an important part in religion, helping to define the separateness of one creed from another by means of dietary taboos. Safran-Foer [2010] suggests that food, family and memory are primordially linked and so what we eat at home as a child has a long-lasting effect on our dietary choices and our ideas about foods as adults [Safran-Foer 2010]. Indeed it is said that images about the traditional cuisine of certain countries reflect national stereotypes. For example, the French may be referred to as *frogs*; the Germans, *Krauts*; the Italians, *Macaronis*; and the English "*Rosbif*" [Farb and Armelagos 1980]. While species' traits determine which animals are suitable prey, depending on the consumer's preference, health, age and status, these factors are

interchangeable. In this study animals that were eaten by some people in Mocagua and San Martín were avoided by others and this varied over time. Taboos associated with illness and danger were particularly influential when deciding what foods should be avoided, as were the social norms that guided group eating with family and friends.

The complexity of food choice is acknowledged globally. It occurs as a specific combination of social and cultural norms that change with differing conditions and circumstances influencing what is available, tolerable or preferable. For example the ancient Egyptians refused to eat eels and cats because they considered them sacred, while pork is shunned by Muslims as being dirty and non-sacrosanct [Simoons 1994]. In some societies people exclude food groups such as meat, dairy, fish, carnivores or insects whilst others, more selectively, refrain from eating certain animals such as beef, horse, camel, dog, chickens and eggs [Mintz and Du Bois 2002]. Equally eating meat and the practices associated with it, such as food preparation and pet-keeping, are fundamental to Tikuna culture and well-being, and serve a number of important social and educational roles that enable animals to become human comrades [Fausto 2008; Cormier 2003; Erikson 2000]. Erikson [2000] maintains, "*Taming [wild animals as pets] and hunting can be considered as two complementary aspects contributing towards the assimilation of animals by human society."* Something considered a delicacy by one group of people may be repulsive to another. Indeed, despite the cultural and nutritional significance of meat for the Tikuna, taboos still exist that limit what is consumed by certain sectors of the community or by particular individuals and at certain times of the year. Safran-Foer [2010] further illustrates this point in his publication 'Eating Animals'. The following passage reads; *"The French who love their dogs sometimes eat their horses. The Spanish, who love their horses, sometimes eat their cows. The Indians who love their cows sometimes eat their dogs*" [Safran-Foer 2010: 25]. Similarly some foods commonly eaten in Mocagua and San Martín during the study were once considered taboo or unpalatable.

New factors now prescribing food choice in Mocagua and San Martín include conservation, tourism and resource management. The switch from a subsistence to consumer lifestyle in ANP is largely influenced by the strategies that people adopt to acquire food. Local livelihoods in Mocagua are currently driven by

increased employment rates created through tourism, which has direct impacts on how much protein is consumed and from where it is sourced, while the gradual breakdown of traditional human-wildlife interactions and sociality is a commonly occurring consequence of these changes. Financial stability typically dictates access to food sources other than those acquired through hunting and fishing, and therefore most people choose to earn a salary when the opportunity arises as this provides them with enough money to acquire the things they need in times of shortage. While some traditional taboos are still adhered to alongside more recently enforced regulations, people's inclination to adhere to either type is largely influenced by economic gain. When viewed as a complete system the consequences of people's choices, their economic activities and the importance of successful conservation become clearly evident.

7.4 “Re-thinking” Conservation

7.4.1 Current initiatives in ANP

The Tikuna have been involved in a variety of conservation and research initiatives carried out by academics and various stakeholders to tackle environmental issues in ANP [**Chapter 1, section 1.4.5**]. The commercialisation of natural resources has long been the main focus in ANP along with advocacy for ecotourism, which on paper aims to address socio-economic issues and show sensitivity towards cultural practices. However, the reality is somewhat different. Local people have been restricted in the amount they can genuinely collaborate due to conflicting goals with stakeholders and the use of a language which is out of context with local ways of addressing the world. These issues have caused a number of drawbacks when trying to implement long-term collaborative planning in ANP. For example, since this study began the Decameron tourist lodge and restaurant have been closed down with the result that local employees are currently without work. At the time of research those people with jobs at the tourist lodge had not been given contracts, and the collapse of the enterprise in 2012 saw several locals out of work with no subsidies or security to fall back on [**Chapter 1, section 1.5.8**]. Furthermore, few of the quotas and regulations identified during collaborative meetings with the communities are now relevant to local people [**Chapter 1, section 1.5.5**].

The goal of conservationists has long been to discourage the hunting of endangered species and to develop sustainable alternatives in their place. Under favourable economic conditions increasing the consumption of purchased or domestically reared meat is a viable option, and if carried out successfully wild animal populations may be temporarily protected [Gruezmacher 208]. For example, the protection of woolly monkeys by Mocagua’s community has only been possible because of the number of jobs provided through the tourist industry. In San Martín, people decided against the same hunting restrictions as applied in Mocagua under the remit that their financial assets were less, and because they feared it would further compromise their traditional practices. These livelihood options require skills and resources however which, if not kept in check, can transform TEK and the cultural practices that connect indigenous peoples to their lands.

7.4.2 Towards 'cultural recognition'

Just as concern was shared among the elderly in Mocagua and San Martín that a change in aspirations among people in their communities has meant obtaining cash is now a primary objective, Sullivan [2008] voices concerns over the development of conservation and ecotourism in indigenous territories globally. She suggests that where consumables and paid work become priorities, little regard is shown for indigenous principles [*ibid.*]. Through tourism, it is said, indigenous communities are turned into "*show pieces for tourists alongside inequality in decision-making and participation*" [Brockington 2009]. Ecotourism not only influences visitors' perceptions of biodiversity and local people but also encourages indigenous communities to reassess their own relationship with nature. The unwillingness to focus conservation schemes away from Western ideals towards more locally apt strategies is the root cause. Additionally, when communities look to development and growth as ways of achieving financial stability the unbalanced distribution of money breeds inequalities and discord between people [Howgego and Roe 1998], while the added pressures created through a reliance on waged work means people are vulnerable to market volatility [Hammond *et al*. 1995]. Furthermore, despite the perceived benefits of introducing technology into indigenous communities if local people are not provided with the appropriate skills and provisions needed to utilise these things properly, indigenous people will become dependent on others to oversee and regulate them. Ultimately this has the effect of dividing rather than uniting those people involved in so-called 'communal' projects.

Without an appreciation of how conditions are continuously evolving in protected areas such as ANP intervention of all kinds will fail due to a mismatch of cultural contexts and an oversimplified understanding of local realities. Indeed, in 1984 Posey *et al.* proposed that the complexity of social and ecological devastation in Amazonia requires alternative strategies for sustainable, ecologically sound development. While Dwyer [1976] has pointed out the need for researchers to adopt more fluid methods when working in indigenous cultures to overcome an unwillingness, or the inability, to adopt the other's point of view which is so often prejudiced by our own understandings. Igoe [cited in Fletcher and Neves 2012: 178] states, "*The more I learn about mainstream conservation models, the more I am convinced that we need to develop alternatives, in the interest of both the*

environment and social justice" [Igoe 2004: xi]. Rather than aiming to change local practices and belief systems, indigenous conceptualisations of the world should be incorporated alongside Western science. As Sullivan [2008] describes it, tourism and conservation based upon Western models breed a 'mono-culture' that invalidates the organic fluidity of traditional belief systems and local communities. Instead, conditions should be nurtured that support biocultural diversity so that sustainability and resilience can be achieved through positive cross-cultural relationships.

Conclusions

"*Animism forces us to rethink our human-centered analytics—those that underpin all of the human sciences as well as the basis for its division from the natural ones—we have to be re-taught to show how the human is open to these other ways of knowing, and being, in the world"* [Kohn 2009: 12].

7.5 Conclusions

7.5.1 Protecting biocultural and intellectual diversity

I have identified the factors shaping human-animal interactions and suggested how these are shaped by the ways in which people experience the world, their cognition and engagement, their knowledge, thoughts, language and education, by environmental, economic and social triggers as well as religion, culture and identity. The evidence I have presented suggests that people's attitudes towards wildlife and their decisions over resource use are a reflection of how they value animals, the networks they establish, and the perceptions they form about themselves and the environment. Central to these decisions is the need to acquire food and maintain an identity through the cultural practices associated with eating and living with animals. The current situation in Mocagua and San Martín demonstrates the outcomes of development and decision-making guided by Western principles when introduced into indigenous lands. It has shown that quick solution strategies such as 'big-business' tourist development is disruptive and unreliable for local people and that the only real beneficiaries are those businesses and companies who establish them. Equally, researchers and policy-makers should move away from conservation and education that invalidates indigenous belief systems, and towards conditions that recognise and support biocultural and intellectual diversity.

These findings suggest that local worldviews are incorporated into conservation and resource management using a language that is inclusive, rather than the specialist terminology currently used, and with a focus on earth-centred, ecocentric notions, adopting holistic ideals. This may require careful and considerate planning that encompasses livelihood outcomes, the dynamics of change and an understanding of intricate human-wildlife relationships. Only then will it be possible to develop a common set of environmental, social and cultural ethics which allow researchers and local people to work together in a fair and cooperative way. An integrated cultural vision is required to ensure the effective design of legislation in regions where humans and wildlife coexist, one that incorporates real-life conditions, their temperance and their flexibility. As well as entering into a dialogue with local people, for the Tikuna this means pledging agreements with forest guardians, animal conspecifics and each other alike.

7.6.2 Recommendations for future work

Meadows *et al*. [2004: 281] has proposed; *"Individualism and shortsightedness are the greatest problems of the current social system and the deepest cause of unsustainability*". My study has led me to believe that future research in this area should explore ways of further integrating indigenous and scientific knowledge, merging disciplines and giving credence to alternative worldviews. While traditional belief systems and practices validate and sustain indigenous societies there is evidence that scientific research, economic development and technical solutions to environmental issues can also be beneficial if carried out in the correct way. For example, where young people from Mocagua and San Martín develop good verbal and written communication skills, and learn an appreciation of other cultures through contact with foreign researchers and tourists, they are more likely to achieve equal authority when representing their communities in international meetings. Indeed, where a common ground can be found, sharing scientific and traditional knowledge, skills and practices will strengthen the resilience of communities through the free-flow of information.

In 1981 the industrial leader Peccei suggested the need for a shift in people's values, thoughts and ways of relating to the world to achieve equity and sustainability. He spoke of creating "*a new value system*". A radical change is still required today, in the way people think about and approach the topic of conservation. Future research in this area should explore different ways of sharing these ideas with individuals, institutions, societies and stakeholders. This calls for new teaching priorities in schools and innovative ways of talking about the environment and human-nature interactions, and discussing collaboration and sustainability in the context of resource management with other cultures and communities.

Chapter 8

Summary of Findings

Chapter 8: Summary of Findings

8.1 Chapter summaries

In this study I examine people's perceptions of wildlife, the community and the forest among the indigenous Tikuna populations and explore the ways people used, categorise, classify and conceptualise wildlife in Mocagua and San Martín [**Chapters 4-6**]. The criteria for this investigation are based upon key elements drawn from a conversation with a group of local hunters who shared with me their concepts of human-nature interrelations and more specifically how the Tikuna engage with their environment [**Chapter 3**]. To carry out a valid non-biased ethnoecological study, unimpaired by my own cultural disposition, an emic approach is adopted. I gather the experiences and stories of local people and combine these data with my own observations and interpretations. In this way I reveal insights into current worldviews among the Tikuna and provide information on resource use and how people's interactions with and ideas about other species are constructed. The methods used acknowledge human-nature relationships as being established through a combination of cognitive and behavioural processes and influenced by culture, society and experience.

By analysing the dietary patterns of people from two communities I determine prey availability and access to other protein sources. I also consider the impact of ecological, social, cultural and economic factors on decisions over resource use. The role of belief systems and worldviews on the recognition of animal species are also examined through conversations with the elderly about Tikuna folklore and traditional classification systems. The human-wildlife interactions described in this study demonstrate the influence of schooling, religion, tourism and conservation in shaping people's ideas about nature and the prevalence of traditional practices and story-telling in establishing networks with other species. During my inquiries people shared their views about some of the modifications and transformations occurring in their communities caused by development and outside intervention. These opinions are included in the thesis referring to source material and suggesting integrated ways of addressing environmental issues in ANP. The main findings and arguments of each chapter are summarised below.

8.1.1 Chapter 3: The Tikuna worldview

In **Chapter 3** I discuss the complexity of environmental, cultural, political and socio-economic factors and how these shape indigenous people's interactions with their environment. This is explained through global theories about human-nature relationships in the West. Environmental perceptions shared by hunters from Mocagua and San Martín during the pilot phase are also presented in this chapter. Their explanations identify some central aspects of the Tikuna belief system, such as shamanism, reciprocity and animism, and draw attention to the opinion that outside intervention and the modification of traditional cultures and practices are detrimental to the natural environment and human-wildlife affiliations. This information is summarised in a diagram drawn by the hunters which illustrates their interwoven and multifarious relationships with nature. These findings establish key themes and generate a number of hypotheses which guide the main body of the study that follows.

8.1.2 Chapter 4: The local use and categorisation of wildlife

The data presented in **Chapter 4** suggest a number of factors influence how wild and domestic species are perceived and categorised by local people in Mocagua and San Martín. Species were listed according to their cultural, economic, nutritional and social capacity and depending on how people engage with them in the forest and community, under the catgories: food, pets, medicine, folklore, arts and crafts and tourism. A significant difference was found between the lists written by participants of different age and sex (number of species listed in six categories; χ^2=411.7, n=971, df=5, p<0.05). People's concepts of wildlife appear to be influenced by traditional practices such as hunting, pet-keeping and fishing, and other such cultural aspects of Tikuna life, however, the persistence of these vary between families and individuals. Women show wider knowledge about animals as food and pets when compared to men (number of species named as food by men and women; χ^2=6, n=105, df=1, p<0.05; number of species named as pets by men and women (χ^2=32, n=75, df=1, p<0.05). This is explained through the greater time they spend in the home caring for animals and preparing food.

Despite wild pet-keeping being a culturally important practice it occurred rarely in either community, and more domestic pets were observed in people's homes than were wild species (wild compared to domestic pets; χ^2= 21.5, n=82, df=1, p<0.05).

Furthermore, the types of animals kept in the home are influenced by changes in local practices and the introduction of regulations by the National Park.

The multifaceted use of animals in the communities mean people have mixed views about wildlife. Some wild animals are deemed ‘culturally-key’ implying their absence would impair the culture of the community, while the body parts from others are used in traditional medicines and crafts. However, these practices require specialist knowledge and are known by only certain sectors of the community, specifically older women. The importance of wild animals as food and pets is significant when compared to the other reference categories, with some overlap between the species named for both (species similarity for food and pets; 32%, n=229). The hunter-prey relationship and the transcendental properties of meat are pivotal in interpreting these affiliations. Animals are an important source of protein for the Tikuna and a variety of wild, domestic and purchased foods constituted a significant portion of the local diet (wild meat compared to domestic and tinned foods; χ^2=22.63, n=733, df=2, p<0.05). Some species were more commonly eaten than others and featured more frequently in dietary logs. This varied between communities due to differing environmental and cultural conditions, personal choice and availability.

Over hunting and habitat destruction in ANP means the composition of local fauna in the region has changed over recent years, thus people’s diets have adapted too. Mammals are difficult to hunt and a number of quotas and regulations have been introduced. Large amounts of fish were eaten during the study but there is evidence that fish stocks are also declining. Where less wild meat is available people become more reliant on domestic and processed foods to supplement their diet but this is largely dependent on their financial gains. People eat domestic meat and to a lesser extent tinned foods when there is no bushmeat and they can afford it. There is no significant association between these variables however (Spearman rank correlation: r_s=0.80, n=24, p<0.05). Restrictions on the consumption of meat are caused by variations in prey availability, a loss of knowledge, disinterest in traditional practices and choice. The role of animals in tourism and their association with folklore also hold precedence among some people in Mocagua and San Martín depending on their personal interests and involvement in research, conservation and tourism.

8.1.3 Chapter 5: Shamanism, folklore and traditional knowledge

Disparities between environmental perceptions of the old and young are identified in **Chapter 5**. The ways in which adults and children categorised wildlife according to the six reference categories food, pets, medicine, arts and crafts, folklore and tourism are significantly different (species lists generated by adults and children for six categories; Pearson's χ^2=38.54, n=864, df=5, p<0.01). These differences are caused by the acquisition and development of modern versus traditional knowledge systems. While Tikuna folk taxonomy was explained in-depth by elders children had only basic understandings which they learnt at school. Elders referred to a number of similarities between human and animal communities, societies and other species, which they explained through inter-species transformations. Shamanism and the identification of 'animal-persons' are central to these notions. This reveals stark differences between traditional classification structures and Western biology.

Notions such as animism and sociality with other beings are negligible among the young as they learn contemporary environmental concepts instead. Most young people in Mocagua have an aversion for learning to hunt (children expressing an interest in learning to hunt; 41% n=124) and children in both communities were intent on finishing school and finding work in paid employment. Many children expressed a wish to migrate to the cities to find jobs. Adults and elders view these adaptations as having an adverse effect on local human-animal relationships although data show that a number of other factors also contribute to these transformations. This is demonstrated through the variety of traditional dietary taboos that still exist in Mocagua and San Martín, alongside regulations imposed by the UAESPNN, researchers and conservation groups.

Data show a high frequency of those species listed as food by participants were not eaten during meal times in the household involved in the study (number of species absent from dietary logs (71%, n=173). This is because of prey shortages, changes in people's attitudes towards dietary taboos and the degree with which people value wildlife for tourism, research and conservation. Although associations with illness and danger are influential factors and restrict what people eat, where prey are limited people are willing to overlook these concerns and eat taboo species. Apart from providing nutrition, food establishes social hierarchies, cultural

identities [Mintz and de Bois 2002] and relationships with other beings (human, animal or spiritual) and places [Pretty 2002; Malinowski 1965]. In Mocagua and San Martín eating animals involves a number of complex food issues such as the availability of purchased and processed foods, the replacement of traditional hunting and agricultural methods with modern techniques, an increased dependency on money, a Western schooling system, the global exchange of food and wildlife, and control by socio-political governance.

8.1.4. Chapter 6: The impact of outside intervention

Chapter 6 shows that local people's attitudes towards outside intervention varies depending on their experiences and the belief systems they follow. Differences between how people from Mocagua and San Martín respond to and view these factors are explored through observations, conversations and by examining species categorisation lists written during workshops. Local people adopt alternative livelihood strategies to earn money and supplement food shortages which means they interact in different ways with wildlife. Recent modifications in the local landscape have driven people towards a more commodity focused approach to resource use and land management. While the type of animals named by participants was similar in both communities (species lists generated by Mocagua and San Martín; Mann-Whitney U-test: U=13, n=924, p>0.05) people from Mocagua listed more wild animals as being important for tourism than did people from San Martín (χ^2=10.782, n=101, df=1, p=0.001). The high number of jobs provided through tourism in Mocagua influence this (90% of families). Similarly local people talk more positively about outside intervention where they are directly profiting from them.

The influence of tourism and conservation is especially prevalent among children who have become accustomed to these practices as part of everyday life. This was expressed through their comments and conversations and appears to have a more significant impact on children's views in Mocagua than it does in San Martín. Environmental variables are at play as well as socio-economic and cultural differences. The number of meals containing different types of meat also differs significantly between the communities because of a significant population decline of some prey species in San Martín's territory (animal taxa consumed in Mocagua and San Martín; Pearson's χ^2=11.62, n=255, df=2, p<0.05).

The increased economic solvency in Mocagua through jobs in tourism means more families have access to domestic meat than they do in San Martín (χ^2=37.44, n=59, df =1, p<0.05). Domestic meat is either reared in the community or bought from the towns. People in San Martín eat fewer principal prey items and a greater variety of 'unusual' prey which they acquire opportunistically. Unequal opportunities and economic benefits means local people have mixed opinions about outside intervention and the importance of conservation in ANP. People from Mocagua and San Martín were interested in implementing different types of projects with support from the UAESPNN in order to improve their future prospects, depending on the different circumstances they had experienced. While the majority of people in Mocagua said employment in tourism, conservation and research provide feasible economic options people from San Martín did not share these views. Instead they proposed projects that were focused on protecting their self-autonomy and indigenous identity.

8.1.5 Chapter 7: Discussion "Wildlife as a conceptual reality"

Chapter 7 provides a comprehensive discussion of the wide-ranging variables structuring and shaping human-wildlife interactions in ANP. The cause and implications of change on environmental and cultural landscapes are explored**.** By referring to the observations and data analysed in the previous three chapters I propose that people's attitudes towards wildlife and conservation and the ways they interact in the world are not only affected by environmental and cultural factors but that they are also a reflection of how they value wildlife, the networks they establish and their perceptions of other beings. This is explained as a culmination of practices, knowledge and experience which not only shape people's actions in the world but are themselves a product of those engagements. Central to the decisions people make over resource use in Mocagua and San Martín is the need to acquire food and maintain a sense of identity, through associated practices and beliefs.

Divergent opinions exist within and between people in Mocagua and San Martín. These manifest themselves through variations in the ways people perceive and relate to nature. People's beliefs are connected to their cultural and historical experiences, as well as a number of contemporary influences. Ideals derived from shamanism and maintained through reciprocal relationships with *dueño*s are

accompanied by reductionist concepts of Western environmental ethics, often associated with the commodification of nature and commercialisation. I propose that these relationships are constructed through an integrated, fluid and impermanent web of interactions, processes and changes and that these data provide a ‘snapshot of reality’ for the Tikuna in ANP. This evidence indicates that biocultural diversity and sustainability will only be achieved if local people’s interests and perceptions are incorporated into conservation and resource management policies.

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Glossary of Terms and Abbreviations

Scientific Terms:

- **Aesthetics** studies the concepts of "beauty" and "harmony."
- **Amerindian perspectivism** discusses the ideas in Amazonian cosmologies concerning the way in which humans, animals and spirits see both themselves and one another. It suggests the possibility of a redefinition of the classical categories of 'nature', 'culture' and 'supernature' based on the concept of perspective or point of view.
- **Analogous** describes comparisons that makes clearer the nature of the things being compared. In biology it defines structures performing a similar function but having a different evolutionary origin, such as the wings of insects and birds.
- **Analogy** is a cognitive process of transferring information or meaning from a particular subject (the analogue or source) to another particular subject (the target). It plays a significant role in problem-solving such as, decision-making, perception, memory, creativity, emotion, explanation and communication.
- **Animal-persons** are animals referred to as ‘persons’ who are capable of transcending human and animal realms and shifting their physical form, a behaviour that enables inter-species communication.
- **Animism** (from Latin *anima* "soul, life") is a philosophical, religious or spiritual idea that souls or spirits exist not only in humans but also in other animals, plants, rocks and natural phenomena such as thunder, geographic features such as mountains or rivers, or other entities of the natural environment. Animism may further attribute souls to abstract concepts such as words, true names or metaphors in mythology.
- **Anthropocentrism** regards humans as the central element of the universe and interprets reality exclusively in terms of human values and experience.
- **Anthropogenic** designates an effect or object resulting from human activity. Anthropogenic effects on the environment include impacts on biophysical environments, biodiversity, and other resources.
- **Axiology** is the philosophical study of value. It studies mainly ethical and aesthetic value. It is either the collective term for ethics and aesthetics—philosophical fields that depend crucially on notions of value—or the foundation for these fields.

- **Bifurcate collateral kinship system** differentiates the uncles and aunts both from the parents and from each other. ‘Collateral’ refers to the siblings of lineal relatives (parents, grandparents) and their descendants.
- **Bifurcate merging** identifies collateral relatives with lineal relatives of the same sex and generation when the connecting relative is of the same sex, but distinguishing them when the connecting relative is of the opposite sex. In a bifurcate merging terminology a father's brother would be identified as father but a mother's brother as uncle.
- **Biocultural diversity** is the term used to describe the scientific exploration of the relationships between human biology and culture. It recognises the inherent conjoining of the two and the need for one to sustain the other; ideas are fundamental to ethnoecological studies.
- **Biodiversity** refers to the variety of species, genes and ecosystems that enhances the resilience and sustainability of natural systems.
- **Cognition** describes mental processes (i.e. the processing of information in the brain) including attention, memory, producing and understanding language, learning, reasoning, problem solving, and decision making. In psychology and cognitive science, "cognition" usually refers to an information processing view of an individual's psychological functions. It is also used in a branch of social psychology called social cognition to explain attitudes, attribution, and groups dynamics.
- **Collaboration** involves working together, especially in a joint intellectual effort to cooperate and reach a common goal.
- **Cooperation** involves mutual assistance by multiple persons who are working towards a common goal following clearly defined tasks in an efficient and collaborative way, so that all members benefit.
- **Critique** is the detailed analysis and assessment of something. To evaluate (a theory or practice) in a detailed and analytical way.
- **Culturally-Keystone Species (CKS)** are animal and plant species attributed tremendous spiritual or symbolic value by different cultures. Some of these species are so important that a cultural group may define them as critical elements in their relationship with and adaptation to the environment. A CKS identifies a plant or animal species whose existence and symbolic value is essential to the stability and existence of a culture over time.

- **Dialectical reasoning** is a method of argument for resolving disagreement central to European and Indian philosophy derived from ancient Greek philosophy.
- **Dietary taboos** are cultural prohibitions that prevent people from consuming certain foods or groups of foods because of religious or folkloric beliefs.
- **Disembodiment** describes a state separated from or existing without the body.
- **Dualism** from the Latin word '*duo'* meaning "two", denotes a state of two parts, in terms of philosophical duality discourse or a system which contains two essential parts. In environmental science this may refer to a separation between humans and nature.
- **Ecologism or Environmentalism** supports advocacy for, or work towards, protecting the natural environment from destruction or pollution according to the theory that environment rather than heredity is the primary influence on intellectual growth and cultural development.
- **Ecology** is an interdisciplinary field that includes biology and Earth Science. It is the scientific study of the interactions between living organisms and their environment.
- **Ecosophy** refers to an ecological philosophy that supports '*ecologism'* [see definition for Ecologism].
- **Ecosystem services** are the collective benefits to humankind received from a multitude of resources and processes supplied by ecosystems, including products such as clean drinking water and processes such as the decomposition of wastes. While scientists and environmentalists have discussed ecosystem services for decades, their definitions were popularised and formalised by the United Nations 2005 Millennium Ecosystem Assessment (MA), grouping them into the four broad categories: *provisioning*, *regulating*, *supporting* and *cultural services*.
- **Ecotourism** is a form of tourism involving visits to fragile, pristine and relatively undisturbed natural areas, intended as low-impact often small scale alternatives to standard commercial tourism. Its purpose may be to educate the traveler, provide funds for ecological conservation, directly benefit the economic development and political empowerment of local communities or foster respect for different cultures and human rights.

- **Emic** The emic approach investigates “how local people think", how they perceive and categorise the world, their rules for behavior, what has meaning for them and how they imagine and explain things.
- **Empirical data** denotes information gained by means of observation, experience, or experiment.
- **Epistemology** is the theory of knowledge with regard to its methods, validity and scope. Epistemology is the investigation of what distinguishes justified belief from opinion.
- **Ethics** Involves questions of right and wrong behaviour following accepted rules of behavior and investigates the concepts of "fair”, “just” and "moral conduct" for individuals and society.
- **Ethnoclassification** is a system of classification derived from the practice and method of collaboratively creating and managing labels to annotate and categorise content. This practice is also known as classification, social indexing and tagging.
- **Ethnoecology** From ethnology (“ethno”) and ecology [refer to definitions for *ethnology* and *ecology*], is the scientific study of how people live in different locations, understand the ecosystems around them and behave within in their environments. It seeks valid, reliable understandings of how humans interact with other beings and how these relationships are sustained over time and signifies people’s understanding and experience of the environments around them.
- **Ethnology** is the localised study of people. It applies a human focused approach to the study of ecology through ‘ethnoecology’ [see definition *ethnoecology*].
- **Etic** The etic approach is typically scientist-oriented and shifts the focus from local observations, categories, explanations and interpretations to those of the anthropologist. When using the etic approach, the ethnographer emphasises what he or she considers important.
- **Exposure** is the act of subjecting, or an instance of being subjected to, an action or an influence, assumed to have some effect on that which is exposed.
- **Folkbiolgy** is the cognitive study of how cultures’ traditionally classify and reason the organic world. From the vantage of evolutionary psychology, such natural systems are arguably routine “habits of mind,” a sort of heuristic method used to make sense of the natural world.

- **Folk taxonomy** is a vernacular naming system, in contrast with scientific taxonomy. Folk biological classification is the way peoples describe and organise their natural surroundings/the world around them, typically making use of form taxa.
- **Heuristic** is an adjective describing experience-based techniques which assist problem solving, learning and discovery in search of the best possible answer, or 'optimal solution'.
- **Holism** is comprehension of the parts of something as intimately interconnected and explicable only by reference to the whole.
- **Holistic reasoning** is the philosophy of 'holism' [see definition for *holism*]. It emphasises the importance of the whole and the interdependence of its parts, and is concerned with systems rather than analysis or separation into parts.
- **Homologous** means having the same relation, relative position, or structure, in particular. In the context of biology, homology is the existence of shared ancestry between a pair of structures, or genes, in different species.
- **Industrialisation** is part of a wider modernisation process, where social change and economic development are closely related with technological innovation, particularly with the development of large-scale energy and metallurgy production.
- **Intellectual** of or relating to the intellect i.e. cognitive processes [see definition for *cognition*].
- **Intellectualism** is the exercise of the intellect at the expense of the emotions. In philosophy it is the theory that knowledge is wholly or mainly derived from pure reason or rationalism [see definition for *rationalism*].
- **Interdisciplinary** Of, relating to, or involving two or more academic disciplines that are usually considered distinct.
- **Intervention** is the act of intervening usually used to describe government, political or diplomatic terms, especially by one state in the affairs of another. In the case of conservation intervention can also describe procedures believed to be of assistance or providing aid to that or those which are 'intervened'.
- **Livelihood strategies** are the combination of activities that people choose to undertake in order to achieve their survival. They include productive activities, investment strategies and reproductive choices and are dynamic to meet people's changing needs. Livelihoods approaches try to understand the strategies pursued and the factors behind people's decisions.

- **Metaphysics** is a way of describing the analysts's receptivity to ambiguity. It is generally thought to be an essential part of his psychoanalytical practice. The interpretation of its multiple meanings can effectively create a 'bridging function' between personally metaphorical meanings and shared literal meanings.
- **Mineral licks** are a natural deposit of exposed salt, or an area rich in minerals, that animals come to, to lick.
- **Mono-culture** refers to the loss of cultural diversity, developed from the term ‘monculture’ which is the agricultural practice of producing or growing a single crop or plant species over a wide area and for a large number of consecutive years.
- **Multifaceted** means to have many facets or aspects.
- **Naturalism** is the idea or belief that only natural (as opposed to supernatural or spiritual) laws and forces operate in the world, i.e. the idea or belief that nothing exists beyond the natural world.
- **Naturogenic** means having a natural cause; used especially of global warming as an antonym to anthropogenic.
- **Objectivity** describes objective truths which are discovered rather than created.
- **Ontology** from the Greek “*of being”* or “*to be”* and “s*cience, study* or *theory*” is the philosophical study of the nature of being or reality. This may include basic categories of being and their relations. Traditionally listed as a part of the major branch of philosophy known as ‘metaphysics’ [see definition for *metaphysics*]. ontology deals with questions concerning what entities exist or can be said to exist, and how such entities can be grouped, related within a hierarchy and subdivided according to similarities and differences.
- **Patri-clan** membership is determined by patrilineal descent from a common ancestor.
- **Paradigm** describes a typical example of something that creates a pattern or model, from the Greek “para” (beside) and “deikunai” (to show).
- **Participatory** or **Participation** refers to mechanisms which enable the public to express opinions regarding political, economic, management or other social decisions. Participatory decision making can take place in any realm of human social activity, including economics, politics, management, culture or familial. For well-informed participation to occur transparency and mutual respect is necessary. Those most affected by a decision should have the most say while those that are least affected should have the least say in a topic.

- **Participatory Film-Making (PFM)** is a form of participatory media where an individual, a group or a community creates their own film to explore issues, voice concerns, tell stories and be creative. It is primarily about process, aimed to be empowering, enable people to take action and solve local problems, as well as communicate their needs and ideas to decision-makers and other groups or communities.
- **Pedadogy** is the method and practice of teaching, especially as an academic subject or theoretical concept.
- **Perception** is the organisation, identification, and interpretation of sensory information in order to represent and understand the environment. All perception involves signals in the nervous system, which in turn result from physical stimulation of the sense organs. It depends upon complex functions of the nervous system, but subjectively seems effortless because this processing happens outside conscious awareness.
- **Philosophy** is the study of general and fundamental problems, such as those connected with reality, existence, knowledge, values, reason, mind, and language.
- **Polarity** describes opposites, such as positives and negatives. In political terms it defines how power is distributed within the international system.
- **Rational thought** explains the discovery of truth and determinant for a person's actions according to logic rather than emotion.
- **Rationalism** [see definition for *rational thought*].
- **Reductionism** is the practice of analysing and describing a complex phenomenon, such as a mental, social, or biological one, in terms of events that represent a simpler or more fundamental level.
- **Sedentarisation** occurs when a dominant group restricts the movements of a nomadic group. The organisation of the modern society imposes demands that push indigenous populations to adopt a fixed habitat.
- **Sedentism** (sometimes called sedentariness), is a term applied to the transition from a nomadic lifestyle to a society which remains in one place permanently.
- **Shape-shifting** is the power to transform and reshape into another human or non-human species, or 'animal-person' [see definition for *animal-persons*]. In mythology and folklore it is the ability to physically transform into another form or being, either as an inherent faculty of a mythological creature, or by means of magic. The concept is of great antiquity, and may indeed be a human cultural

universal, present in the oldest forms of totemism or shamanism. Shape-shifting is usually induced by the act of a deity. The most common form of shape-shifting is therianthropy, the transformation of a human being into an animal (or conversely of an animal into human form).

- **Socio-economics** is a social science that studies how economic activity affects social processes. In general it analyzes how societies progress, stagnate or regress because of their local or regional economy, or the global economy.
- **Soul** or "*anima"* in many religious, philosophical, psychological and mythological traditions, is the incorporeal and immortal essence of any sentient being. Some belief systems (most notably animism and Jainism) teach that all biological organisms and non-biological entities (such as rivers and mountains) possess souls. 'Anima mundi' is a concept of a "world soul" [see definition for *anima mundi*].
- **Subjectivity** refers to a person's perspectives or opinion, particular feelings, beliefs, and desires. It is often contrasted with objectivity, used casually to refer to unsubstantiated personal opinions, in contrast to knowledge and fact-based beliefs.
- **Syntax** is the study of the principles and processes by which sentences are constructed in particular languages.
- **Totemism** coveys belief in a primary source, such as the land or ancestors, who provide the basis to all life. Indigenous groups, such as the Australian Aboriginals are most famously totemic in their worldview.
- **Traditional Ecological Knowledge (TEK)** is a particular form of environmental knowledge typically associated with indigenous people's ancient belief systems. It describes diversity and interactions among plants and animals, landforms, watercourses, and other traits of the biophysical environment in a given place and is typically learn through experience and traditional practices.
- **Transcendental** means relating to a spiritual or nonphysical realm. It is often used to describe the journeying of the soul.
- **True name** is a name of a thing or being that expresses, or is somehow identical with, its true nature. The notion that language, or some specific sacred language, refers to things by their true names has been central to philosophical and grammatical study as well as various traditions of magic, religious invocation and mysticism since antiquity.

- **Utilitarian** is something designed to be useful or practical rather than attractive, e.g. practical, functional, pragmatic, serviceable, useful, sensible and efficient. Utilitarian philosophy means relating to, or adhering to the doctrine of utilitarianism [see the definition for *utalitarianism*].
- **Utilitarianism** can be characterised as a quantitative and reductionist approach to ethics. It is a type of ‘naturalism’ [see definitions for *reductionism* and *naturalism*].
- **Worldview** is the fundamental cognitive orientation of an individual or society encompassing the entirety of the individual or society's knowledge and point-of-view. It may include natural philosophy, fundamental, existential and normative postulates or themes, values, emotions and ethics.

Local Terms:

- **Ariana** was a female shaman(shamana) who, according to Tikuna folklore, transformed into a hummingbird to cut the sun's rays. She is said to be the sister of Mawachü.
- **Buri buri** is the local name for *Aotus sp.*
- **Dueño** translates literally into "owner". Sometimes also referred to as '*el madre'* (meaning "the mother") it is the name given to the spiritual guardian of any animal or plant in the forest. The dueño of any animal must be appeased before taking prey to avoide her from seeking avengance.
- **Cabildo** An assembly who assist the *Curaca* in decision-making processes through a democratic-process with the rest of the community [see definition for *Curaca*].
- **Cenawā** is one of the three spiritual forms of the tapir.
- **Chagra** This is the family allotment or garden on the outskirts of the community where people cultivate land and grow staples such as yuca and plantain.
- **Churuco** Local name for woolly monkey (*Lagotrix lagotricha)* in the local Tikuna language.
- **Cortudo** Local name for howler monkey (*Alouatta spp.)* in the local Tikuna language.
- **Curaca** Village chief or headman who represents the community at a governing level and oversees meetings with the Cabildo or local council [see definition for *Cabildo*].
- **Curupira** The mother of the forest and lives in the *Ceiba pentandra*, which is the sacred tree of creation for the Tikuna. She is also one of the three forms of tapir according to Tikuna folk taxonomy.
- **Gavilán Tatatao** Local name for the red-throated caracara *(Daptrius americanus)* in the local Tikuna language.
- **Imi imi** is the demonic form of the tapir who seeks revenge on hunters.
- **Jaré** One of two spiritual forms of the jaguar, supposed by the Tikuna, to be very dangerous and powerful.
- **Maloca** A communal roundhouse, where a number of Tikuna families would live, eat and sleep. Made from natural materials traditionally with a fire in the centre creating a central point for socialisation.

- **Masato** is an alcoholic beverage made from fermented yuca said to provide strength and energy, when working. It is drunk during celebrations, rituals and ‘mingas’ [see definition of *minga*].
- **Mawachü** is the brother of Ariana the hummingbird and a Shamana. Similar to his sister Mawachü is an important figure in Tikuna history and folklore associated with creation.
- **Minga** During a *minga* people from the community work together for example, to weave leaves to make a new roof, to construct a house, carve a canoe, harvest crops, cut firewood etc. Normally food and *masato* are shared between the workers. People are invited to take part in a *minga* by ringing the community bell.
- **Mojojoy** is the local Tikuna name for the Palm Weevil (*Rynchophorus spp.*). A grub which is highly esteemed as a sacred food with high nutritional value.
- **Pelazón** Young people refer to their responsibility to generate life and maintain the original equilibrium between man and nature. Nowadays the *Pelazon* is performed very rarely – and normally as an attraction for tourists.
- **Poé** are a spiritual form of the jaguar. Smaller in size they are referred to as the dogs of Jaré.
- **Pusanga** is the local word for a type of talisman that attracts mates and prey. Humans and other animals may possess *pusanga*.
- **Salado** is the local name for mineral lick [see definition for *mineral licks*].
- **Sapo Walo** is the name given to a large edible toad hunted by the Tikuna.
- **Yoi and Ipi** were the first Tikunas and sons of Nüputa.

Abbreviations:

ANP - Amacayacu National Park

ASA - Association of Social Anthropologists

CBD - The Convention on Biological Diversity

CKS - Culturally-Keystone Species [see definition]

ICP - Integral Criteria Priorities

LWGR - Local Working Group on Research

NGO - Non-governmental Organisation

PFM - Participatory Film-Making [see definition]

TBI - Tropenbos International

UAESPNN - Unidad Administrativa Especial del Sistema de Parques Nacionales Naturales (The National System of Natural Parks in Colombia)

UN - United Nations

UNESCO - United Nations Economic and Social Council

UNPC - Unidade Parques Nacionales of Colombia

WGIP - UN Working Group on Indigenous Populations (formerly the WCIP)

Appendices

Appendix I - 1.1 Official letter of request and information sheet setting out the planned work presented to *Curaca* in Mocagua and San Martín in ANP, Colombian Amazon [English translation]

OXFORD BROOKES UNIVERSITY

Department of Anthropology & Geography
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UK

Date: 20 March 2007

Investigating local perceptions of wildlife and conservation among the community of Mocagua and San Martin in Amacayacu National Park, Colombia

My name is Hannah Parathian. I am a research student from the Department of Anthropology and Geography in the School of Social Sciences and Law at Oxford Brookes University, UK. I am writing to ask permission to carry out research involving the communities of Mocagua and San Martin in the above named study.

The aim of my research is to provide a better understanding of the relationship that local people, living within Amacayacu National Park, have with wildlife and nature. I am interested in investigating the changes brought about by the apparent reduction in resource availability, the introduction of management resource initiatives, and exposure to western conservation ethics and conservation development ideas. I hope to work alongside local communities to provide a complete and accurate understanding of how indigenous livelihoods are being affected, in order to ensure the needs of both people and wildlife are fully considered in any future conservation planning.

The study is funded by The Woolly Monkey Project and is being conducted by myself with advice from Dr Catherine Hill from the Department of Anthropology and Geography at Oxford Brookes University, and Dr Laura Rival from the Department of Social and Cultural Anthropology at the University of Oxford. I have kindly been granted permission to carry out this work by the Special Administrative Unit of the Natural National Parks Agency, Colombia or UAESPNN (Unidad Administrativo Especial del Sistema de Parques Nacionales Naturales Colombia).

I would like to stress that participation in the project is voluntary and all participants will be free to withdraw from the study at any point, should they change their mind. I enclose an information form explaining a little more about the nature of the research. This will be read to each of the communities prior to starting data collection. I hope that you will find my work of interest and that you will see its benefits. If you would like to discuss any aspects mentioned here please fell free to contact me (hannahparathian@yahoo.co.uk).

Many thanks for your time.

Yours sincerely

Miss Hannah Parathian

OXFORD BROOKES UNIVERSITY

Date: 20 March 2007

Investigating local perceptions of wildlife and conservation among the indigenous communities of Mocagua and San Martin in Amacayacu National Park, Colombia

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please listen to the following information carefully. Please ask me if there is anything that is not clear or if you would like more information.

Purpose of the study
This study will examine the use of wildlife in daily life, interactions with wildlife and nature and local perceptions of wildlife and conservation among two indigenous communities living within a large National Park in the Colombian Amazon.

Why I am asking you to take part
You have been invited to participate in this study because you live close to the forest and use local resources in daily life. I am interested to find out your views about conservation work being carried out in Amacayacu and whether or not this has had any effect on your lives and/or livelihoods.

Do you have to take part?
It is up to you to decide whether or not to take part. If you decide to take part you are free to withdraw from the project at any time and without giving a reason.

How will you take part?
If you decide to take part in this study one or two co-investigators will be invited to accompany me (Hannah Parathian) on a walk around the village, pointing out places of importance and assisting with mapping. Ten focal households will be asked to keep a record of the resources used to prepare daily meals every week. This will be followed by a short interview conducted by myself with the assistance of a local translator. This will last no longer than half an hour. Hunters will be asked to log when and where they catch prey including a description of what is caught. A group discussion will be held every fortnight, also offering an opportunity for workshops and training events. These meetings will be held in the local meetinghouse, scheduled at a time that is convenient to those wishing to take part. Interviews and group discussions will focus on the subject of wildlife use, interactions with nature, natural resource management and other related topics. You will be able choose specific topics that you see especially relevant or specific. These meetings may be recorded in order to keep an accurate record of what is being said.

Possible benefits of taking part
All participants will receive any necessary training required, such as the use of a hand held GPS unit, vegetation mapping etc. This will provide skills that may be useful for employment as co-investigators in future projects. It is hoped that the results of the study will provide information that may contribute towards appropriate collaborative conservation planning within the park, and benefit local communities and local wildlife. I hope that this study will offer a chance for you to have your opinion heard so that the communities needs may be considered in future conservation planning.

Confidentiality
All information given will be kept confidential unless otherwise requested by participants. No names will appear on transcripts of recordings; no names will be used in any reports or publications; faces will be blanked out on any video footage if requested, and all papers and tapes will be kept in a locked filing cabinet in the UK. The data generated in the course of the research will be kept securely in paper or electronic form for a period of five years after the completion of a research project in accordance with the University's policy on Academic Integrity.

The results of the research study
I will inform the Park officials of the preliminary results of the study at regular points throughout the duration of the study. At the end of the project there will be a final meeting for all participants and other interested parties to review the projects findings. A written summary will be given to each community and the full report submitted to The University of Leticia and the UAESPNN (Special Administrative Unit of the Natural National Parks Agency). Additional copies of the full report will also be available on request. The entire village will also be invited to a film showing session in the local meetinghouse at the end of the study that will show selected highlights from the project. One video will be given to each community to keep. Additionally, the results will be written up as a series of articles for publication in academic journals. Presentations will be given on my return to the UK to inform other researchers of the importance of considering local needs and perspectives in the design of conservation projects.

Organisation and funding of the research
The study is being led by Miss Hannah Parathian (Dept. of Anthropology and Geography, Oxford Brookes University, Oxford) with advice and assistance from my supervisors Dr Catherine Hill (Oxford Brookes University) and Dr Laura Rival (Oxford University)

Who has reviewed the study?
The study has been approved by the university Research Ethics Committee, Oxford Brookes University.

Contact for Further Information
If you have any queries about the study, please feel free to contact me or my supervisor using the contact details below:

Miss Hannah Parathian
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Oxford Brookes University
Gipsy Lane Campus
Oxford, OX3 0BP
UK

During the course of the study I will be living locally. Please feel free to ask me questions if you have any further queries. I will be more than happy to answer them.

Thank you for taking the time to listen to this information.

If you have any concerns about the conduct of this project please contact the Chair of the University Research Ethics Committee at Oxford Brookes University on ethics@brookes.ac.uk

Appendix I - 1.2 Copy of letter sent to The National Park Headquarters in Leticia [signed by Park Director of ANP granting permission for work to go ahead]

Leticia, el 6 de febrero de 2008

Señor Alexander Alfonso
Oficina PNN Amacayacu
Carrera 9 No 6-100
Apto 201
Leticia
Colombia Amazonas

Apreciado Señor Alexander Alfonso,

El motivo de mi carta es para comunicarle que a partir de la fecha represento al Proyecto Churuco. Mi nombre es Hannah Parathian, soy estudiante de doctorado del departamento de Antropologia y Geografia de la Universidad Oxford Brookes.

El nombre de la investigación que realizaré es *Percepciones sobre la fauna por parte de dos comunidades Tikunas, zona sur del Parque Amacayacu, Amazonas, Colombia: Un enfoque etno-ecológico*. Dicha investigación es parte del Proyecto Churuco, el cual ha manifestado su interés en dar continuidad al trabajo con las Comunidades de Mocagua Y San Martin. Durante los meses de enero a julio del 2008, deseo realizar un acercamiento a las comunidades, pues a pesar de haber trabajado en el 2005 por un periodo de seis meses y en 2007 de marzo a junio, me gustaría continuar con mi trabajo, con el fin de actualizar la información previa. Posteriormente se continuaria con el proyecto a partir de noviembre/diciembre de 2008. Adjunto le remito un informe del trabajo realizado durante mi visita pasada, de marzo a junio de 2007, junto con un horario de las actividades propuestas para esta visita.

Con la participación de las comunidades, me gustaría continuar usando una camera de video con toda la comunidad (hombres, mujeres, niños, jóvenes, ancianos y padres de familia) ofreciendo la oportunidad de registrar sus opiniones sobre diferentes temas importantes para ellos. Esta es una actividad muy valiosa para que todos aprendan. La idea es que estos cortometrajes ayudaran en la comunicación con otras comunidades (en Colombia y reino unido) y en el parque nacional. Tras mi ultima visita mande DVD's con los videos realizados por la comunidad, para evaluar su propio trabajo. Estas actividades serán llevadas a cabo con las iniciativas de los participantes.

Adicionalmente, esperamos obtener información sobre la importancia de la fauna salvaje para la cultura, economia y vida diaria de la comunidad, registrando los alimentos y el uso de recursos naturales en casa, otra parte es explorar la clasificación de especies salvajes por personas de diversas edades. Con su autorización, también me gustaria ayudar en la escuela, y organizar actividades adicionales por los niños, con los profesores. Dispongo de muchos materiales para ellos. También, durante mi estancia voy a colaborar con los censos de grandes mamiferos, llevados a cabo con los coinvestigadores de Mocagua y San Martin, y en compañía de Angela Maldonado y otros voluntarios del Proyecto.

De antemano muchas gracias por su colaboración.

Cordialmente,

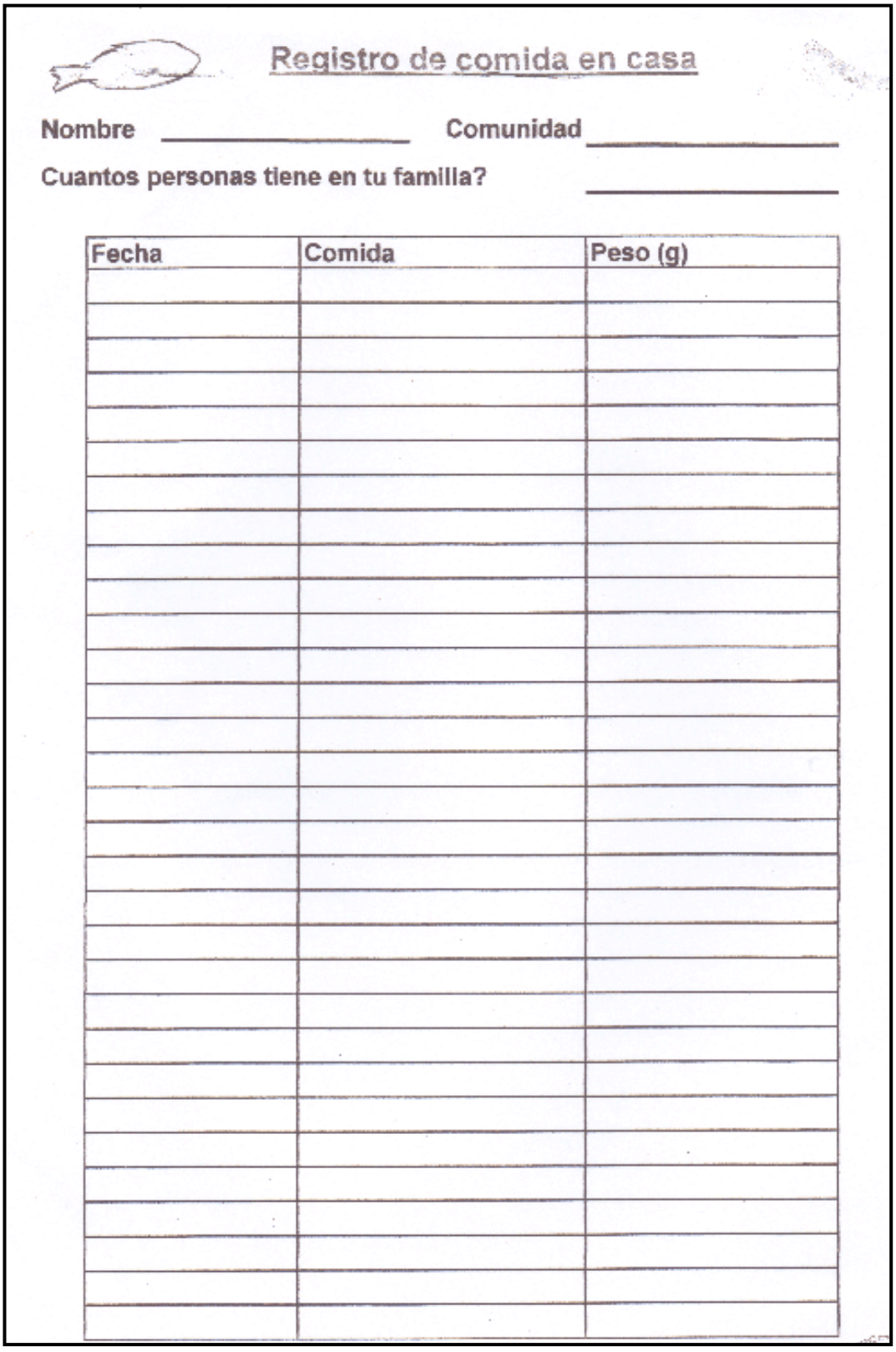
Hannah Parathian

Recibí Alexander Alfonso 06-02-08

Appendix II - 2.1 Demographic tables of population in Mocagua and San Martín in the Colombian Amazon

Demographic group		Mocagua	San Martín
Group	(age in yrs)	n	n
Children	(5-15)	246	258
Males	(16-59)	85	79
Females	(16-59)	123	96
Elders	(60+)	57	47
Total no. of participants		511	480

Appendix III - 3.1 Log sheet to record the weight of meat and fish eaten during data analysis in Mocagua and San Martín in the Colombian Amazon



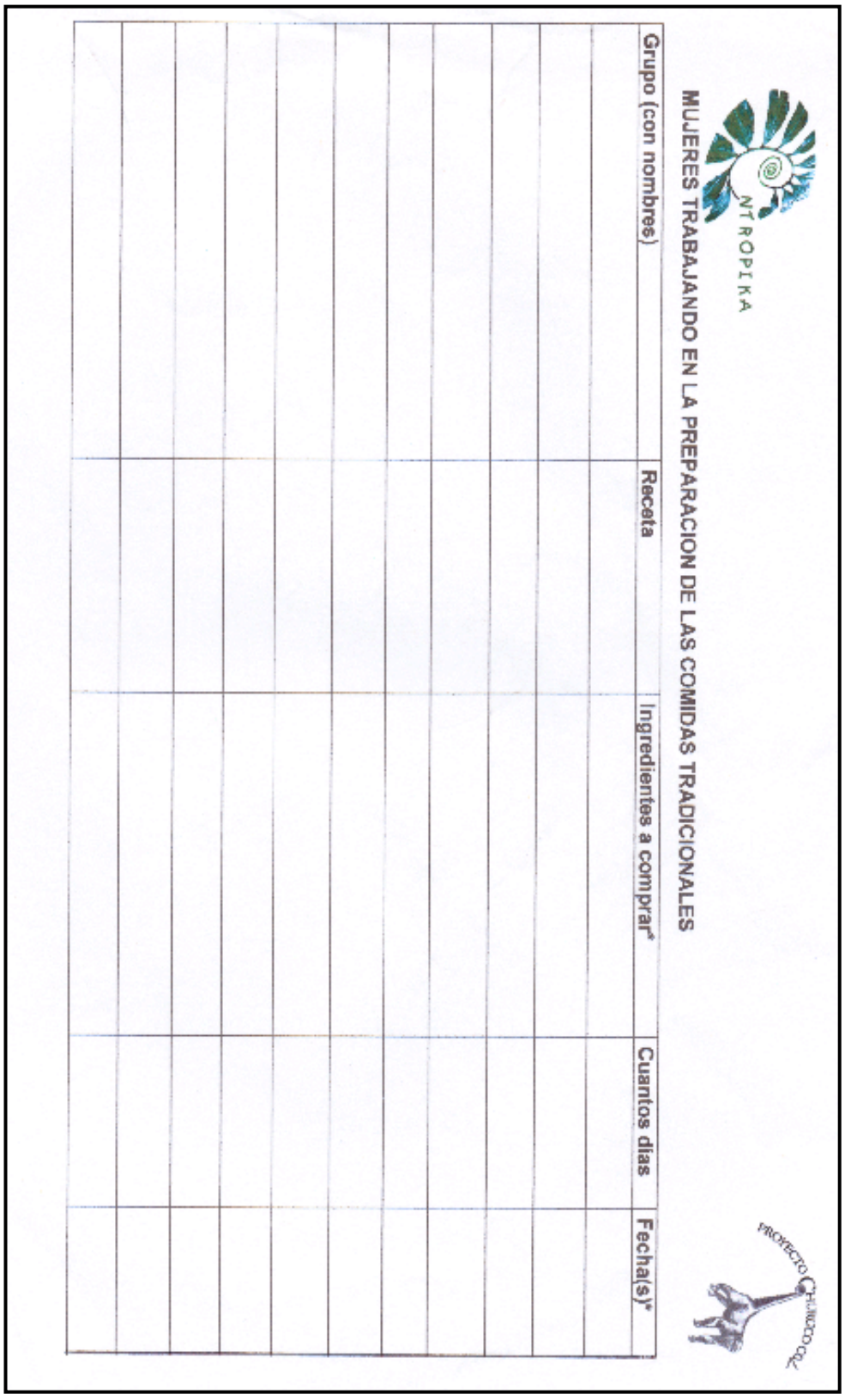
Registro de comida en casa

Nombre _____ Comunidad _____

Cuantos personas tiene en tu familia? _____

Fecha	Comida	Peso (g)

Appendix IV - 4.1 Planning sheet for communal cooking sessions with female participants in Mocagua and San Martín in the Colombian Amazon



Appendix V - 5.1 Certificates awarded to women who completed Participatory Film-Making (PFM) workshops in Mocagua and San Martín, Colombian Amazon

Cocinando Comidas Tradicionales

Completó satisfactoriamente el curso en el uso de la cámara de video y participó en la producción de documentales sobre comidas tradicionales contribuyendo al fortalecimiento de la cultura Tikuna.

Se firma en la comunidad de Mocagua, Amazonas, Colombia, en Mayo de 2008.

Con el apoyo de Universidad Oxford Brookes, The Parlez Foundation, Proyecto Churuvo y Fundación Entrepitos

Cocinando Comidas Tradicionales

Completó satisfactoriamente el curso en el uso de la cámara de video y participó en la producción de documentales sobre comidas tradicionales contribuyendo al fortalecimiento de la cultura Tikuna.

Se firma en San Martín de Amacayacu, Amazonas, Colombia, en Mayo de 2008.

Con el apoyo de Universidad Oxford Brookes, The Parlez Foundation, Proyecto Churuvo y Fundación Entrepitos

Appendix V - 5.2 Certificate awarded to participants who completed Participatory Film-Making (PFM) workshops in San Martín, ANP, Colombian Amazon

Taller en Video Participativo

Con el apoyo de Universidad Oxford Brookes, The Parkes Foundation, Proyecto Churuco y Fundacion Entropika

Completó un curso en el uso de la cámara de video y participó en la producción del documental "Naineku arü ore" - Reseñas Históricas de la comunidad de San Martín, contribuyendo al fortalecimiento de la cultura Tikuna

.....

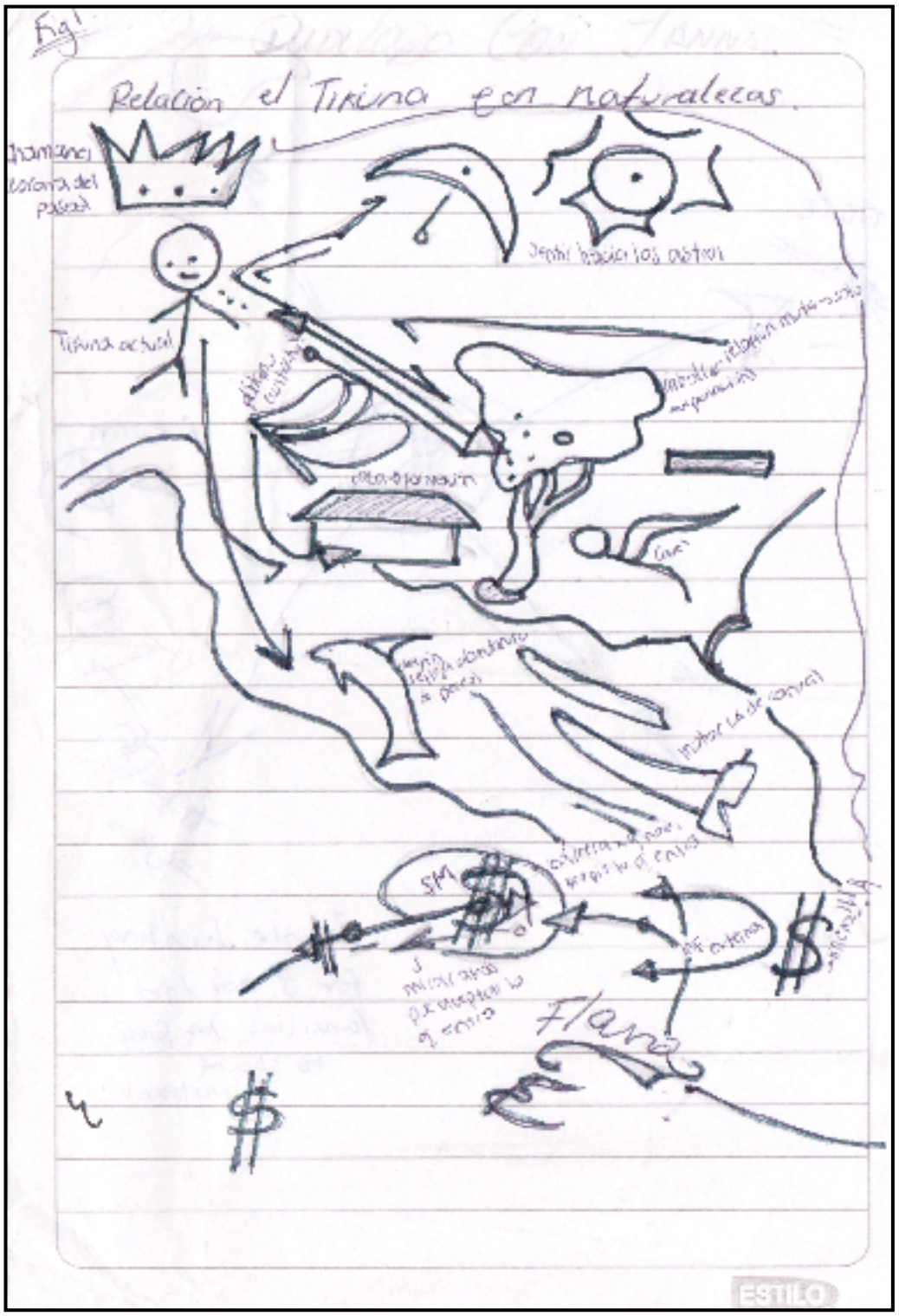
.....

Se firma en San Martín de Amacayacu, Amazonas, Colombia, en Mayo de 2008

Appendix VI - 6.1 The four informal laws of ecology and their associated opposing capitalist norms as proposed by Commoner [1971]

	Laws of Ecology	Capitalist Norms
1.	Ecosystems are complex and interconnected. All beings are connected through a series of symbiotic relationships.	Capitalism demands the simplification of processes and relationships.
2.	Matter and energy are preserved. Waste produced through ecological processes are recycled through continuous cycles.	Economic production is linear. Processes run from sources to overflowing sinks in order to increase yields.
3.	Changes to natural systems caused by man-made technological interventions are detrimental to the system in the long-run.	The self-regulating market is controlled and powered by people.
4.	The exploitation of nature always carries an ecological cost.	Nature’s bounty is a free-gift to the property owner to be profited from and valued as a commodity.

Appendix VII - 7.1 Scan of original illustration drawn by hunters from Mocagua and San Martín in ANP, Colombian Amazon



Appendix VIII - 8.1 Section from species lists generated during categorisation tasks completed by participants in Mocagua and San Martín in the Colombian Amazon [culturally-key species underlined]

Pets		Food		Arts and Crafts		Medicine		Tourism		Folklore	
San Martín	Mocagua	San Martín	Mocagua	San Martín	Mocagua	San Martín	Mocagua	San Martín	Mocagua	San Martín	Mocagua
Alacrán	Abeja	abeja	ardilla	abeja	Anaconda	abeja	Arrera	anaconda	Abejas	abeja	Alacran
Algodón	Alacran	araña	arenga	ardilla	Ardilla	boa	Boa negra	arañas	Alacran	alacran	Araña
arañas	Araña	arawana	armadillo	boa	Armadillo	boruga	Boruga	boa	Anaconda	Anaconda	Ardilla
ardilla	Armadillo	ardilla	bacu	borugo	boa	capibara	Cahrapita (tortug	boruga	Armadillo	arañas	arenga
armadillo	Arrendajo	armadillo grande	bocachico	caracol	Boruga	chicua	caiman	caiman	Boa	arrera	armadillo
arrendajo	Avispa	armadillo pequeño	Boruga	Cawara/Bacú	Caiman	chulo	Camungo	Chunzo	Boruga	bebe leche	bacu
arrera	azulejo	arrera	Brianquiña	cerrito	Caracol	comejen	Caracol	conga	Buho	Bebe leche	Boa Negra
Avoja	Bebeleche	bacu	bufalo	Chunzo	cerrito	cotudo	Chucha	cotudo	caiman	boa	boruga
Azulejo	Boruga	Bebe leche (boqui blan	Burl Burl	cotudo	comejen	cucha	Cotudo	cuebras	Camungo	borugo	bubilo
Bebe leche	bufalo	Bocachico fish	Charapita	Danta	Cotudo	cucumbo	Cuzumbo	Danta	Cangrejo	caballo	caballo
borugo	buho	borugo	caiman	garza	Danta	Danta	Danta	delfin (bufeo)	Buho	caiman	Caiman
buho	bumo	burl burl (nocturno)	camungo	gavilan	delfin	gato	delfin	delfin (rosado)	Chulos	Chunzo	camello
carpintero	caballo	caiman tigre	Capibara	guacamayo	Garza	iguana	Gallina negra	frailes	Concorno (ratón)	Condor	camungo
chicua	Cahrapita (tortuga)	capibara (chigüiro)	cará	guara	Gavilan	mantona	Matamata	gato montes	cotudo	conga	cará
chigüiro	Caiman	caracol	Cemito	jaguar	Guacamayo	matamata	Mojojoy	guacamayo	Culebra	cucarron	camaro
chivo	camello	Cerillo	Chancja	lagartija	Gualo (sapo)	mojojoy	Momoloy	guara	Momoloy	curupira	carpintero
chulo	camungo	chancja	chigüiro	loro	Jaguar	murciélago	oso	lobo del agua	Danta	Danta	cerillo
cigüeña	capibara	chigüiro	chiguira	maizero	loro	patos	Oveja	mantona	delfin	delfin gris	chigüiro
cocinero	Carpintero	chivo	chirui	mariguaja	momoloy	pauji	panguana	mono blanco	frailes	Delfin rosado	Chivi
Condor	cerillo	chocana	Chucuzo	mono blanco	Nutria	pelejo panema	Puerco espin	nutria	Garza	Duende	Chucuzo
coro coro	Chigüiro	churuco	Cono cono (ratón	oso hormiguero	Oso Hormiguero	perro	Raya	pantera	Gaucamayo	gavilan	colibri
cucaracha	Chulos	cigüeña	corbina	pauji	Pava colorada	pescados	Tatatao	perro de monte	Grillo	guacamayo rojo	Conga
cucumbo	Chunzo	comea	picon	Perezoso (Pelejo)	tamboon	Temion	piel roja	Guara	guacharaca	Cono cono (ratón)	
Danta	conejo	cotudo	Pintadillo	Puerco	tortuga	Trueno	piraña	Guatinos	guara	Cotudo	
falda vieja	cotudo	Cucha fish	cucha	Puerco espin	vaca	Vaca	tarantula	Leoncito (pielrojo, chi	guaxino	Mamozay	
gallina	Cucaracha	cuerpo espin	Cuzumbo	sapo guamboi	Tangarana	Zorro	tortuga	loro	Jaguar	culebra	
ganzo	Cui	cui	Danta	tintin	Tarilla		tucan	Manati	lobo	Curupira	
garza	Danta	cupiso	dormilon	tortuga	Tatatao		venado	Mantona	lombris	Danta	
garza tigre	elefante	cusumbo	gallina	tucan	Tente		wangana	Mariposa	Loro carlcoco	delfin	
gato	gallina	Danta	garrapata	venado	Tigre		mico nocturno	Matamata	maizero	elefante	
gavilan	Ganso	Dormilon fish	garza	volador	Tortuga			mico nocturno	mandi (vaca marina	gallina	
Gaviota	garza	gallina	Gualo (sapo)	Wangana/puerco	Tucan			mono blanco	momoloy	garrapata	
Golondrina	Gato	Garrapata (Pavote)	guara	zorro	venado			Momoloy	mosquito	garza	

Appendix IX - 9.1 List of edible wild animal species named by participants from Mocagua and San Martín during research from 2007-2009 in the Colombian Amazon (excluding fish)

	Order	Family	Latin name	Common name
Mammals	*Artiodactyla*	Cervidae	*Mazama Americana*	Red deer
		Cervidae	*Mazama gouazoubira*	Grey deer
		Tayassuidae	*Tayassu tajacu*	Collared peccary
		Tayassuidae	*Tayassu pecari*	White-lipped peccary
	Carnivora	Felidae	*Leopardus pardalis*	Ocelot
		Felidae	*Leopardus wiedii*	Margay
		Felidae	*Panthera onca*	Jaguar
		Mustelidae	*Eira Barbara*	Tayra
		Mustelidae	*Pteronura brasiliensis*	Giant otter
		Mustelidae	*Lontra longicaudis*	Otter
		Procyonidae	*Nasua nasua*	Coati
		Procyonidae	*Potus flavus*	Kinkajou
		Canidae	*Galictis venaticus*	Badger
		Canidae	*Speothos venaticus*	Wild dog
		Canidae	*Atelocynus microtis*	Short-eared dog
	Cetacea	Delfinidae	*Sotalia fluviatilis*	Tucuxi
		Iniidae	*Inia geoffrensis*	Amazon river dolphin
	Marsupialia	Didelphidae	*Didelphis sp.*	Common opossum
	Perissodactyla	Tapiridae	*Tapirus terrestris*	Tapir
	Primates	Aotidae	*Aotus vociferans*	Night monkey
		Atelidae	*Alouatta seniculus*	Colombian howler monkey
		Atelidae	*Lagothrix lagothricha*	Common woolly monkey
		Cebidae	*Cebus albifrons*	White-fronted capuchin
		Cebidae	*Saguinus nigricollis*	Tamarin
		Cebidae	*Saimiri sciureus*	Squirrel monkey
		Pitheciidae	*Callicebus torquatus lucifer*	Titi monkey
		Pitheciidae	*Pithecia monachus*	Saki monkey
		Cebidae	*Cebuella pygmaea*	Pygmy marmoset
	Rodentia	Agoutidae	*Agouti paca*	Paca
		Dasyproctidae	*Dasyprocta fuliginosa*	Black agouti
		Erethizontidae	*Coendou sp.*	Porcupine
		Sciuridae	*Sciurus sp.*	Squirrel
		Hydrochaeridae	*Hydrochaeris hydrochaeris*	Capybara

	Order	Family	Latin name	Common name
		Echimyidae	*Echimys sp.*	Red-nosed tree rat
		Dasyproctidae	*Myoprocta pratti*	Acouchy
	Sirenia	Trichechidae	*Trichechus inunguis*	Amazonian manatee
	Xenarthra	Dasypodidae	*Dasypus sp.*	Armadillo
		Dasypodidae	*Priodontes maximus*	Giant armadillo
		Bradypodidae	*Bradypus variegatus*	Three-toed sloth
		Megalonychidae	*Choloepus didactylus*	Two-toed sloth
		Myrmecophagidae	*Myrmecophaga tridactyla*	Giant anteater
		Myrmecophagidae	*Tamandua tetradactyla*	Tamandua
Reptiles	*Chelonia*	Chelidae	*Podocnemis unifilis*	Yellow-headed sideneck turtle
		Chelidae	*Podocnemis expansa*	South American river turtle
	Crocodilia	Alligatoridae	*Melanosuchus niger*	Black caiman
		Alligatoridae	*Caiman crocdilus*	Common caiman
	Testudines	Chelidae	*Chelus fimbriata*	Mata-Mata
		Testudinidae	*Geochelone denticulata*	South American yellow-footed tortoise
Birds	*Ardeiformes*	Ardeidae	*Tigrisoma lineatum*	Rufescent tiger-heron
	Incertae sedis	Cathartidae	Coragyps atratus	Black vulture
	Falconiformes	Acciptridae	*Geranospiza caerulescens*	Crane hawk
	Galliformes	Cracidae	*Penelope jacquacu*	Cauca guan
		Cracidae	*Aburria pipile*	Common piping-guan
		Cracidae	*Crax globulosa*	Wattled curassow
		Cracidae	*Crax mitu*	Razor-billed curassow
		Cracidae	*Nothocrax urumutum*	Nocturnal curassow
		Cracidae	*Otalis sp.*	Variable chachalaca
	Piciformes	Ramphastidae	*Ramphastos tucanus*	White-throated toucan
	Procellariformes	Psophidae	*Psophia crepitans*	Grey-winged trumpeter
	Psittaciformes	Psittacidae	*Amazona farinose*	Mealy parrot
		Psittacidae	*Ara manilata*	Red-bellied macaw
		Psittacidae	*Ara ararauna*	Blue and yellow macaw
		Psittacidae	*Ara macao*	Scarlet macaw
	Tinamiformes	Tinamidae	*Tinamus spp.*	Tinamou
		Tinamidae	*Cryturellus undulatus*	Undulated tinamou
Insects	*Curculionidae*	Curculionidae	*Rhynchophorus spp*	‘Mojojoy’ palm weevil
Amphibians	*Anura*	Bufonidae	*Unknown*	‘Galo/Walo’ toad

Appendix X - 10.1 The traditional use of animals' body parts in medicines and crafts by the Tikuna in the communities of Mocagua and San Martín, Colombian Amazon

Species	Part used	Details of use
Anaconda (*Boidae Family)*	Fat	-Rubbed into the skin to cure fractures
	Skin	-Drums
Arriera ants (*Atta sp.)*	Body	-Boiled in a tea to cure coughs
Armadillo *(Dasypus sp.)*	Shell	-Crafts
	Hoof	-Grate it into a tea and it stops bleeding
	Oil	-Bronchitis
Bat *(Chiroptera.Order)*	Unknown	-Used to make '*pusanga*' or talisman charged to dominate or attract other animals
Black caiman (*Melanosuchus niger)*	Fat	-Rubbed into the chest to cure bronchitis
	Oil	-Fractures, asthma, bronchitis virility rheumatism
	Teeth	-Necklaces
Colombian short-tailed bat *(Carollia brevicauda)*	Penis	-Helps cure hernias
Cuckoo (*Cuculidae Family)*	Fat	-Rubbed into stomach to ease pregnancy pains
	Eggs	-Rubbed on to shins of babies to help them walk
Deer (Mazama spp.)	Skin	-Dried and stretched for drums and to make shoes
	Bones	-Rubbed on the legs of children to strengthen their bones, used to hang pots from
Dolphin *(Inia geoffrensis)*	Penis	-Cure for impotency
Eel *(Anguilliformes Order)*	Kidney	-Rubbed against the skin to help ease out splinters
Fox (*Canidae Family*)	Oil	-Bronchitis and colds
	Teeth	-Increase female fertility
Golden Tegu Lizard *(Tupinambis teguixin)*	Tongue	-Boiled in a tonic and drunk to stop people talking
	Teeth	-Crushed and mixed into a drink to make teeth strong
	Fat	-Rubbed onto skin to prevent excessive hair growth
	Skin	-Dried and stuffed to make into a toy
Heron (*Garza morena)*	Bone	-Flute
	Feathers	-Crafts
Hen (*Gallus gallus domesticus)*	Oil	-A drop taken from a black hen can assist women during childbirth
Honeybee *(Bombus lapidaries)*	Wax	-To make candles
	Honey	-Cure coughs and colds
	Oil	-To help babies learn to walk

Species	Part used	Details of use
Horned Screamer (*Anhima cornuta)*	Leg	-Rub against foot to help cure ingrown nails
Howler monkey *(Alouatta seniculus)*	Skin	-Drums
	Teeth	-Crafts
	Oil	-Cures rheumatism and to assist babies start walking
	Bile duct	-Drink bile to cure snake bites
	Throat sac	-Used as a shot glass to cure laryngitis
Jaguar, ocelot, cougar (*Panthera onca, Leopardus spp*.)	Fur	-Traded outside of the community
	Teeth	-Worn as a necklace for protection and decoration
	Claws	-Worn as a necklace for strength and for decoration
Matamata' turtle (*Chelus fimbriatus)*	Shell	-Tea made from its shell cures bronchitis
	Skin	-Shoes
Mink (*Neovision vision)*	Fur	-Traded outside of the community
Monkeys (*Primate Order*)	Skin	-Dried and stretched for drums
Otter (*Pteronura brasiliensis, Lontra longicaudis*)	Fur	-Traded outside of the community
Paca (*Agouti paca)*	Bile	-Applied to disinfect snake bites and cure diabetes
	Bones	-Arts and crafts
	Feet	-Postpartum sickness and hemorrhaging
	Hair	-Used in black magic to make you invisible
Parrots (*Psittacidae Family*)	Feathers	-Used in jewelry and head dresses, to be sold and for the *Pelazón*
Porcupine (*Coendou sp*.)	Skin	-Drums, inhale vapour to clear head and stop vomiting
	Spines	-Necklaces
Red-throated Caracara *(Daptrius americanus)*	Unknown	-Used to make '*pusanga*' or talisman charged to dominate or attract other animals
Shark (*Squaliformes Order*)	Bile duct	-Repels majiña ants from the home
	Vein	-Cures rheumatism
Sloth (Bradipus variagatus, Choloepus didactylus)	Bladder	-Hung above the bed to stop bedwetting
	Claws	-Worn as a necklace for protection
	Oil	-Powerful aphrodisiac
Snail (*Naticidae Family*)	Shell	-Used in jewelry and head dresses
	Tongue	-Stops the growth of moles
	Blood	- Mixed into a soup will help reduce a women's bleeding during menstruation
Squirrel (*Sciuridae Family)*	Tail	-Duster
Tapir (*Tapirus terrestris)*	Skin	-Dried and stretched for drums
	Hoof	-Grated is a cure for post-partum sickness and bleeding

Species	Part used	Details of use
Termite *(Coptotermes formosanus)*	Body	-Boiled in water and drunk as a laxative, cures acne
Tortoise (*Geochelone dneticulata)*	Shell	-Used as a bowl, seat and instrument for the *Pelazón*
Wattled curassow *(Crax globulosa*)	Throat	-Cures ulcers
	Feathers	- Arts and crafts
White-faced heron (*Eira Barbara)*	Teeth	-Increases women's fertility and growth of plants
	Penis	-Improves men's virility

Appendix XI - 11.1 Fish species named in dietary logs recorded by participants in Mocagua and San Martín, Colombian Amazon [underlining indicates those species most frequently consumed]

Species name	Common name	No. of meals	% of meals
1. Brycon spp.	Sabaló	61	11
2. Sardina sp.	Sardine	47	8.5
3. Pygocentrus palometa	Palometa Pirana	39	7.1
4. Prochilodus sp.	Bocachico	27	4.9
5. Colossoma sp.	Pacu	21	3.8
6. Pterygoplichthys multiradiatus	Plecastomus catfish	17	3.1
7. Hexanematichthys platypogon	Sea Catfish	16	2.9
8. Pseudoplatystoma sp.	Southamerican Catfish	14	2.5
9. Liza sp.	Mullet	13	2.4
10. Pterodoras granulosu	Granulated Catfish	9	1.6
11. Somniosus sp.	Dogfish	8	1.4
12. Unknown	Pira-boton	6	1.1
13. Arapaima gigas	Arapaima	4	0.7
14. Calophysus macropterus	Piracatinga catfish	4	0.7
15. Unknown	Yuarachi	4	0.7
16. Hypophthalmus sp.	Mapara	3	0.5
17. Cichla sp.	Peacock Bass	2	0.4
18. Serrasalmus sp.	Pirahna	2	0.4
19. Unknown	Cara	1	0.2
20. Centrochir crocodilis	Centrochir catfish	1	0.2
21. Coryphaena hippurus	Dolphin-fish	1	0.2
22. Unknown	Jabon	1	0.2
23. Pterois sp.	Lionfish	1	0.2
24. Gerreidae sp.	Mojarra	1	0.2
25. Unknown	Murupa	1	0.2
26. Hydrolycus scomberoides	Payara	1	0.2
27. Ortalis ruficauda	Rufous-vented Chacha	1	0.2
	Unnamed	247	44.6
	Total	553	100

Appendix XII - 12.1 Mammal species named in dietary logs recorded by participants in Mocagua and San Martín, Colombian Amazon [underlining indicates those species most frequently consumed]

Species name	Common name	No. of meals	% of meals
1. Agouti paca	Paca	37	22.6
2. Tapirus terrestris	Tapir	24	14.6
3. Mazama spp.	Deer	23	14
4. Dasyprocta fuliginos	Black agouti	18	11
5. Dasypus novemcinctus	Nine-banded armadillo	10	7.1
6. Tayassu pecari	White-lipped peccary	9	6.1
7. Bos primigenius	Domestic cattle	**7**	**4.3**
8. Primate Order	Primates	**5**	**3**
9. Sus scrofa domestica	Domestic pig	3	1.8
10. Bradypus variegatus	Three-toed sloth	2	1.2
11. Potos flavus	Kinkajou	2	1.2
12. Hydrochaeris hydrochaeris	Capybara	1	0.6
13. Aotus vociferans	Night monkey	1	0.6
14. Nasua nasua	Coati	1	0.6
	Unnamed	21	12.8
	Total	164	100

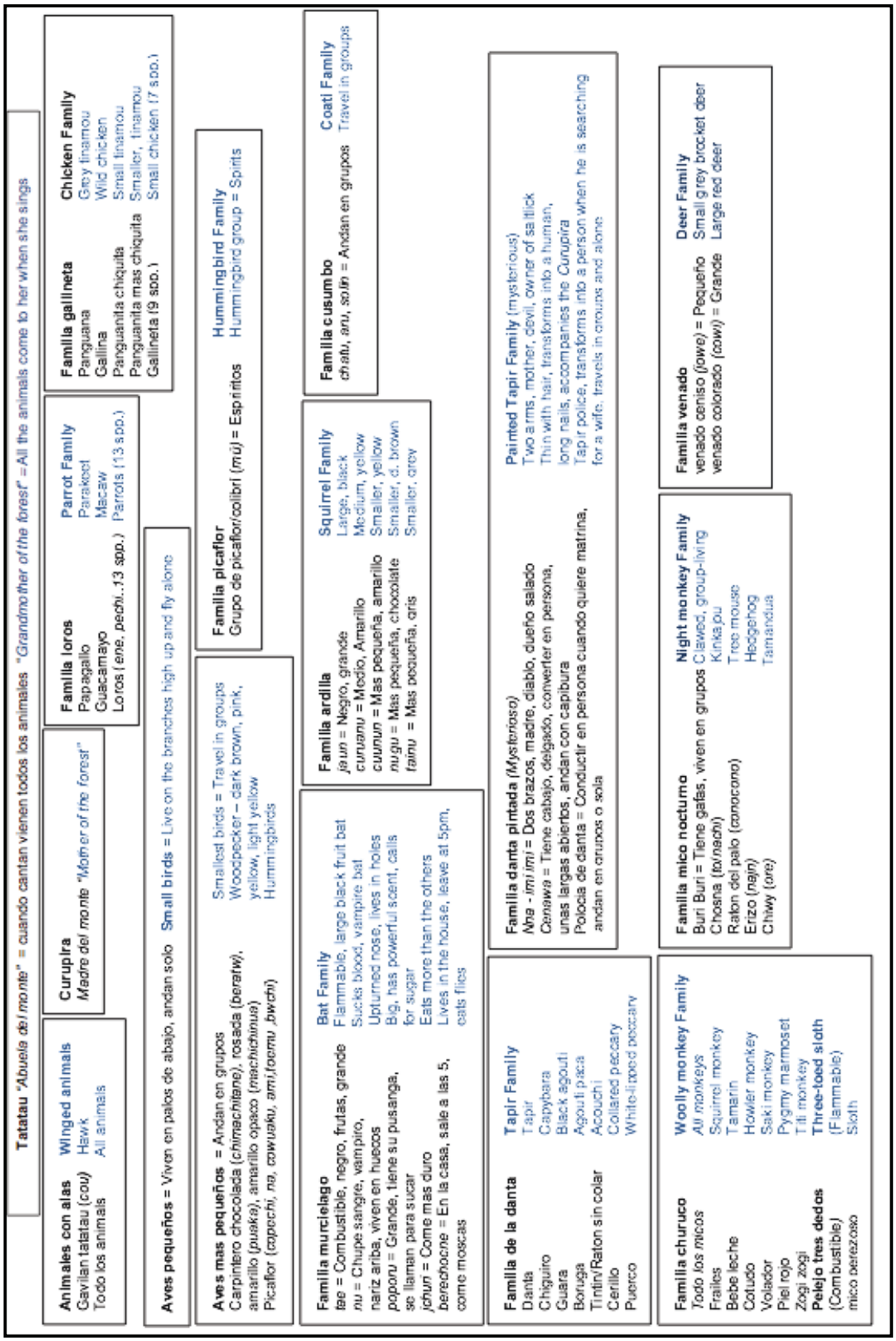
Appendix XIII - 13.1 Bird species named in dietary logs recorded by participants in Mocagua and San Martín, Colombian Amazon [underlining indicates those species most frequently consumed]

Species name	Common name	No. of meals	% of meals
1. Gallus gallus domesticus	Domestic chicken	53	85.5
2. Anas platyrhynchos	Duck	3	4.8
3. Opisthocomus hoazin	Hoatzin	2	3.2
4. Crax spp.	Curassows	2	3.2
5. Columbidae Family	Columbidae	1	1.6
6. Aburria aburri	Wattled Guan	1	1.6
	Total	62	100

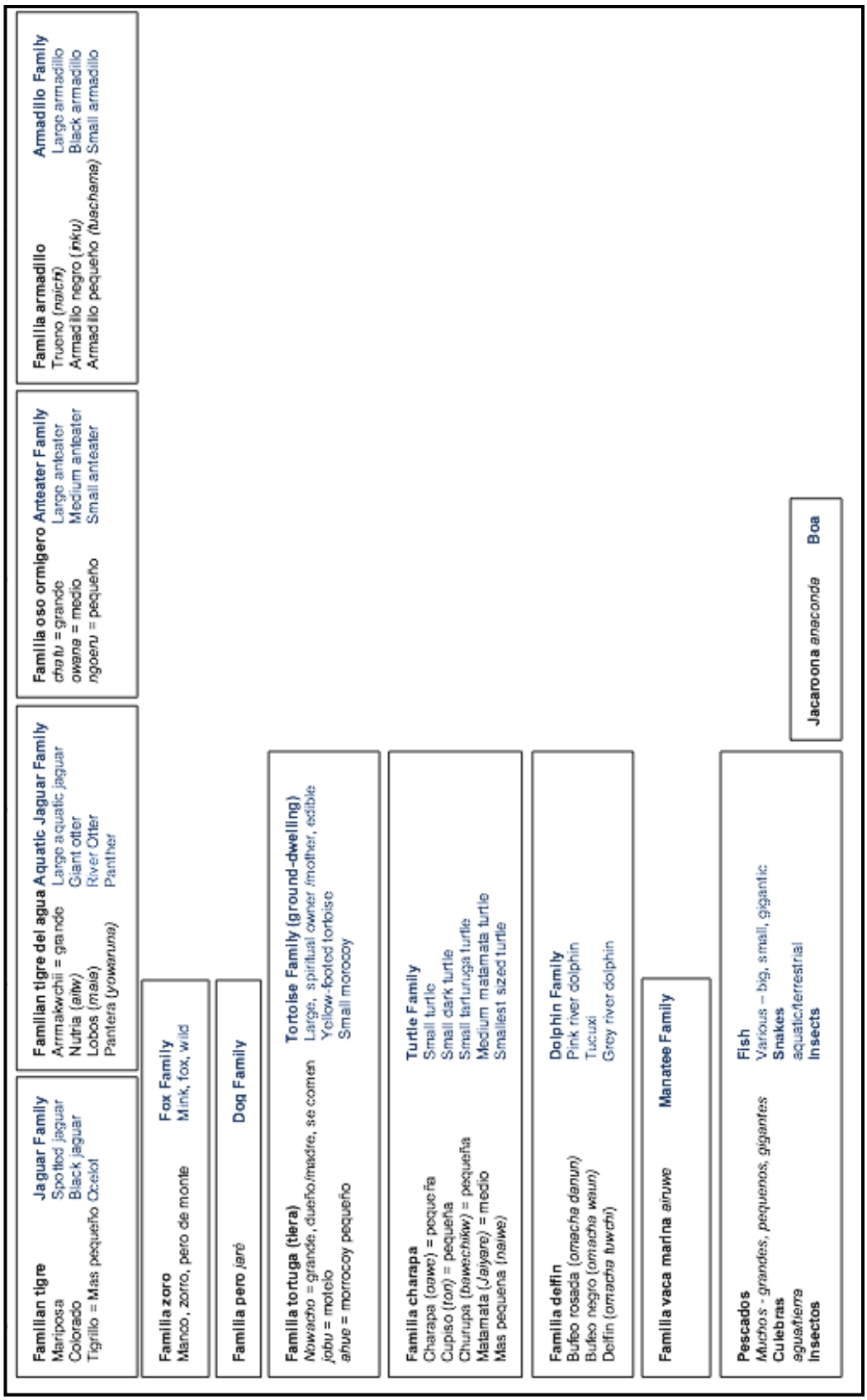
Appendix XIV - 14.1 Percentage of meals containing wild, domestic and bought meat or fish recorded in dietary logs from Mocagua and San Martín, Colombian Amazon [underlining used to indicate the amount that domestic meat was consumed]

	Wild fish	Bush meat	Domestic meat	Bought fish	Bought meat
Mocagua	64%	21%	12%	1%	2%
San Martín	76%	17%	2%	4%	1%
Sample Population	68%	20%	7%	3%	2%

Appendix XV (PART 1 OF 2) - 15.1 Animal classification tree depicting traditional Tikuna folk taxonomy as described by a group of elders from Mocagua and San Martín in ANP, Colombian Amazon



Appendix XV (PART 2 OF 2) - 15.1 Animal classification tree depicting traditional Tikuna folk taxonomy as described by a group of elders from Mocagua and San Martín in ANP, Colombian Amazon



Appendix XVI - 16.1 Comparisons between animal species named during classification tasks in San Martín, with animal species consumed in San Martín over a ten-month period in the Colombian Amazon

Animal Type	Dietary Log	Animal Classification
Amphibian	x	Saddleback Toad
Bird	Black Curassow	Black Curassow
Bird	Chicken	Chicken
Bird	Duck	Duck
Bird	Wattled Guan	Wattled Guan
Bird	x	Dove
Bird	x	Grey-Winged Trumpeter
Bird	x	Heron
Bird	x	Horned Screamer
Bird	x	Laughing Falcon
Bird	x	Red-winged Tinamou
Bird	x	Small birds, true parrots
Bird	x	Tinamadou bird
Bird	x	Wattled Curassow
Bird	x	White-faced Heron
Bird	Canje Pheasant	x
Fish	Bocachico	Bocachico
Fish	Goliath Catfish	Goliath Catfish
Fish	Granulated Catfish	Granulated Catfish
Fish	Mojarra	Mojarra fish
Fish	Mullet	Mullet
Fish	Pacu	Pacu fish
Fish	Palometa Pirana	Palometa pirana
Fish	Plecastomus catfish	Plecastomus, catfish
Fish	Sardine	Sardine
Fish	Southamerican Catfish	Southamerican Catfis
Fish	x	Atlantic Tarpon
Fish	x	Bagre picalon
Fish	x	Brycon
Fish	x	Eel
Fish	x	Long-tailed River St
Fish	x	Mapara fish
Fish	x	Pirahna
Fish	x	Pirarucú
Fish	x	Saltwater Fish
Fish	x	Sleeper shark, dogfish
Fish	x	Tetra fish

Fish	Arapaima	x
Fish	Yuarachi	x
Fish	Dogfish	x
Fish	Dolphin-fish	x
Fish	Murupa	x
Fish	Pira-boton	x
Fish	Sabalo	x
Fish	Tinned fish	x
Insect	Palm weevil	Palm weevil
Insect	x	Honey bee
Mammal	Black Agouti	Black Agouti
Mammal	Capybara	Capybara
Mammal	Cow	Cow
Mammal	Deer	Deer
Mammal	Monkeys	New World Monkeys
Mammal	Night Monkey	Night Monkey
Mammal	Nine-Banded Armadillo	Nine-Banded Armadillo
Mammal	Paca	Paca
Mammal	Pig	Pig
Mammal	Tapir	Tapir
Mammal	White-lipped Peccary	White-lipped Peccary
Mammal	x	Amazon Bamboo Rat
Mammal	x	American buffalo
Mammal	x	Collared Peccary
Mammal	x	Sheep, Ram
Mammal	x	Fiery Squirrel
Mammal	x	Giant Armadillo
Mammal	x	Guinea pig
Mammal	x	Howler Monkey
Mammal	x	Koati
Mammal	x	Porcupine
Mammal	x	Red Acouchy
Mammal	x	Three-toed sloth
Mammal	x	Two -toed sloth
Mammal	x	Woolly Monkey
Reptile	Matamata Turtle	Matamata Turtle
Reptile	x	Caiman
Reptile	x	Iguana
Reptile	x	South American River Turtle
Reptile	x	Tortoise
Reptile	x	Yellow-footed tortoise

Appendix XVI - 16.2 Comparisons between animal species named during classification tasks in Mocagua, with animal species consumed in Mocagua over a ten-month period in the Colombian Amazon

Animal Type	Dietary Log	Animal Classification
Amphibian	x	Frog
Amphibian	x	Saddleback Toad
Bird	Black Curassow	Curassow
Bird	Chicken	Chicken
Bird	Canje Pheasant	x
Bird	Dove	x
Bird	x	Blue-and-gold Macaw
Bird	x	Domesticated Turkey
Bird	x	Duck
Bird	x	Great Green Macaw
Bird	x	Grey-Winged Trumpeter
Bird	x	Laughing Falcon
Bird	x	Lettered Aracari
Bird	x	Macaw, Guacamaya
Bird	x	Red-winged Tinamou
Bird	x	Small birds, true parrots
Bird	x	Sparrowhawk
Bird	x	Swan
Bird	x	Tinamadou bird
Bird	x	Wattled Curassow
Bird	x	Wattled Guan
Bird	x	White-faced Heron
Fish	Catfish	Catfish
Fish	Mapara	Mapara fish
Fish	Mullet	Mullet
Fish	Piranha	Piranha
Fish	Peacock Bass	Peacock Bass
Fish	Plecastomus catfish	Plecastomus, catfish
Fish	Sardine	Sardine
Fish	Sea Catfish	x
Fish	Bocachico	x
Fish	Cara	x
Fish	Dogfish	x
Fish	Jabon	x
Fish	Lionfish	x
Fish	Pacu	x
Fish	Pira-boton	x

Fish	Payara	x
Fish	Piracatinga Catfish	x
Fish	Rufous-vented Chacha	x
Fish	Sabalo	x
Fish	Yuarachi	x
Fish	Granulated Catfish	Granulated Catfish
Fish	Southamerican Catfish	Southamerican Catfish
Fish	x	Long-tailed River Stingray
Fish	x	Silver Arowana
Fish	x	Trahiras
Insect	Palm weevil	Palm weevil
Insect	x	Freshwater snail
Insect	x	Honey bee
Mammal	Nine-Banded Armadillo	Armadillo
Mammal	Black Agouti	Black Agouti
Mammal	Deer	Deer
Mammal	Kuati	Kuati
Mammal	Night Monkey	Night Monkey
Mammal	Monkeys	New World Monkeys
Mammal	Paca	Paca
Mammal	Tapir	Tapir
Mammal	Sloth	Three-toed sloth
Mammal	Sloth	Two -toed sloth
Mammal	White-lipped Peccary	White-lipped Peccary
Mammal	Kinkajou	Kinkajou
Mammal	x	Amazonian Manatee
Mammal	x	American mink
Mammal	x	Capybara
Mammal	x	Collared Peccary
Mammal	x	Dog
Mammal	x	Giant Anteater
Mammal	x	Giant Armadillo
Mammal	x	Goat
Mammal	x	Guinea pig
Mammal	x	Howler Monkey
Mammal	x	Jaguar
Mammal	x	Pig
Mammal	x	Porcupine
Mammal	x	Red acouchy
Mammal	x	Red Brocket Deer
Mammal	x	Saki Monkey

Mammal	x	Squirrel
Mammal	x	Tamandua
Mammal	x	Tamarin
Mammal	x	Titi Monkey
Mammal	x	White Fronted Capuchin
Mammal	x	Woolly monkey
Reptile	Caiman	Caiman
Reptile	x	Bromeliad Lizard
Reptile	x	Bushmaster Snake
Reptile	x	Iguana
Reptile	x	Matamata Turtle
Reptile	x	Red-headed Amazon River turtle
Reptile	x	Turtle
Reptile	x	Yellow-footed tortoise

Appendix XVII - 17.1 Reasons provided by local participants from Mocagua and San Martín why certain species are no longer hunted in ANP [underlining indicates those species protected by a combination of traditional and modern regulations]

Species	*"Provide jobs"*	*"Taste bad"*	*"Cause illness"*	*"Powerful"*	*"Carnivorous"*	*"Small"*	*Endangered"*	Total
Woolly monkey	**X**						**X**	2
Howler monkey	**X**						**X**	2
Saki monkey	**X**						**X**	2
Capuchin monkey	**X**						**X**	2
Squirrel monkey	**X**						**X**	2
Titi monkey	**X**						**X**	2
Tamarin monkey	**X**						**X**	2
Pygmy marmoset	**X**					**X**		2
Red nosed tree rat	**X**					**X**		2
Manatee	**X**						**X**	2
Jaguar	**X**		**X**	**X**	**X**			4
Ocelot	**X**		**X**	**X**	**X**			4
Cougar	**X**		**X**	**X**	**X**			4
Vulture		**X**			**X**			2
Anteater		**X**						1
Tamandua		**X**						1
Dolphin	**X**			**X**			**X**	3
Deer			**X**	**X**				2
Giant otter	**X**	**X**	**X**		**X**			4
Hummingbirds				**X**		**X**		2
Total	**15**	**4**	**5**	**6**	**5**	**3**	**9**	**47**

Appendix XVIII - 18.1 Number of species named by participants from Mocagua and San Martín for each of the six reference categories given as a percentage of the total number of different species named for the corresponding category [underlining indicates data referred to in text]

	Category					
	Food %	Pets %	Tourism %	Medicine %	Arts %	Folklore %
Mocagua	50	55	38	55	53	58
San Martín	50	45	62	45	47	42
Total	100	100	100	100	100	100

Appendix XIX - 19.1 Disparities between prey species eaten in Mocagua and San Martín during ten months in the Colombian Amazon, taken from complete lists of prey species compiled during categorisation tasks and taken from dietary logs provided by local participants [underlining highlights species referred to in text]

Mocagua	San Martín
Species lists	*Species lists*
Amazon Bamboo Rat	American mink
American buffalo	Capybara*
Collared Peccary	Collared Peccary
Sheep, Ram	Dog
Fiery Squirrel	Giant Anteater
Giant Armadillo	Giant Armadillo
Guinea pig	Goat
Howler Monkey	Guinea pig
Coati*	Howler Monkey
Porcupine	Jaguar
Red acouchy	Pig
Three-toed sloth*	Porcupine
Two -toed sloth*	Red acouchy
Woolly Monkey	Woolly Monkey
	Squirrel
	Tamandua
	Tamarin Monkey
	Titi Monkey
	White Fronted Capuchin
	Saki Monkey
	Squirrel Monkey

Appendix XX - 20.1 Comparisons between the types of food eaten over a ten month period in the communities of Mocagua and San Martín in the Colombian Amazon (n=497 in Mocagua and n=325 in San Martín, where n is the total number of meals recorded) [underlining indicates significant differences]

	Birds	Mammals	Fish	Insects	Reptiles	None**
Chi-square	27.56	20.77	12.09	1.8	0	1
df	1	1	1	1	1	1
p-value	p<0.05	p<0.05	p<0.05	p>0.05	p>0.05	p>0.05
Significance*	*sig*	*sig*	*sig*	*ns*	*ns*	*ns*

**ns* = Not statistically significant at the 5% level *sig* = significant at the 5% level

** Data on the number of meals eaten with no meat or fish were included for each of the significance tests carried out for the 5 different types of animal protein.

Appendix XXI - 21.1 Mammal and bird species consumed by participants in Mocagua and San Martín over a ten month period in ANP, Colombian Amazon [underlining indicates differences in data between the two communities]

Mocagua	San Martín
Black Agouti	Black Agouti
Deer	Deer
Cow	Night Monkey
Capybara	Coati
Monkeys	Monkeys
Kinkajou	Kinkajou
Nine-Banded Armadillo	Nine-Banded Armadillo
Paca	Paca
Pig	Sloth
Tapir	Tapir
White-lipped Peccary	White-lipped Peccary

Appendix XXII - 22.1 Proportion of meals containing domestic meat in Mocagua and San Martín given as percentages of the total frequency domestic meat was eaten over a ten-month period in ANP, Colombian Amazon [perforated markings indicate the division between families from Mocagua and San Martín]

	Mocagua								San Martín			
Family	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	Total
Chicken %	44	2	3	7	11	3	2	2	2	2	3	81
Cow %	5	0	7	0	0	0	0	0	0	0	0	12
Duck %	3	0	2	0	0	0	0	0	0	0	0	5
Pig %	0	0	0	2	0	0	0	0	0	0	0	2
Total %	52	2	12	9	11	3	2	2	2	2	3	100

Manuscripts

Appendix XXIII removed